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THE WESTERN RESERVE UNIVERSITY BULLETIN is designed to serve as a medium of communication between the University and its alumni, friends and the general body of scholars engaged in teaching or research. It contains a report of the most important acts of the Board of Trustees and of the Faculty, a record of the publications and public lectures of the Faculty and of the most important accessions to the library; accounts of special research work in prosecution; original contributions from the Faculty or advanced students dealing with subjects of scientific or educational interest; brief summaries of contributions by members of the Faculty to other periodicals; notices of books written by the Faculty, and such other matter as is deemed suitable for the ends in view, which are the diffusion of information in regard to the work of the University, the preservation of a permanent record of its activities and the promotion of science in the broadest sense, by the publication of original contributions to knowledge.

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A COMPLETED CHAPTER IN THE HISTORY OF THE ATOMIC THEORY.*

The great discovery of the law of gravitation was left reasonably complete by its author. The explanation of this fact is obvious. No other force of sensible magnitude complicates the action of gravitation; its law appeals to simple geometrical relations; and the facts had been well observed and reduced to order. Accordingly, by a few numerical comparisons of the hypothesis with the facts, Newton established the truth of his conjecture, so that it has been generally accepted as a law of nature. The first suggestion of the theory was quickly followed by its final triumph.

Very different has been the history of the discovery which most chemists regard as next in importance to that of Newton. The discovery that matter consists of an aggregation of infinitesimal units or individuals was made by Dalton; but the first suggestion of this kind had been made at least twenty-two centuries before Dalton. Leucippus and Democritus were the earliest recorded believers in this doctrine; Epicurus adopted it; Lucretius expounded it in strains of noble eloquence. But all the early suggestions were quite barren and unfruitful for the advancement of science, for no one before the present century was in a position to make any verifiable hypothesis; and science grows by means of hypotheses so closely in touch with facts as to be verifiable. In later times, Leibnitz accepted the notion of a certain kind of atomic structure of matter; Newton accepted, and reasoned soundly upon, a view which Dalton recognized as akin to his own. Kant seems to have adopted the contrary opinion, and to have believed that matter is infinitely divisible. But Bernouilli made the conjecture, which has since been verified, that a given volume of gas consists of a very large number of very small discrete particles, which we now call molecules; and Higgins, an English chemist, a contemporary of Dalton, was the first to apply the notion of atoms to the explanation of chemical phenomena, although he did not think clearly in regard to the weight of atoms, and so formed no useful hypothesis. Accordingly the net result of twenty-two centuries of thought on this subject was to form a conception of a possible structure of matter, without imagining any way of establishing the truth or error of this conception, or even of gaining any evidence whatever in regard to it. But, if any are inclined to visit this failure with reproach, it is interesting to notice that the first man who was aware of the quantitative relations which are adapted to throw light on the matter did not fail to make the most full and complete use of this knowledge.

Dalton, and not the ancients, ought to be regarded as the discoverer of the atomic structure of matter, because he invented a hypothesis, involving such a structure, which was capable of being so compared with facts as to be proved or contradicted; because he actually began such a comparison of the hypothesis with the facts; and because all the evidence from facts, varied as it has since become, supports the hypothesis substantially in the form which he gave it. He who suggests that a certain benefit is desirable, or who conjectures that it is possible, shall not fail of due credit; but he who *confers* the benefit will receive the credit due the benefactor.

Since Dalton's discovery, much has been done to confirm and enlarge our knowledge of the atomic structure of matter. New evidence has been acquired in favor of it, because the theory has been ready to extend over whole realms of facts of a kind unknown to Dalton, to explain them, to facilitate their study; and also ready to predict facts, unknown till they were sought in consequence of the prediction, but found when they were sought.

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*Address by Professor Edward W. Morley, the retiring President of the American Association for the Advancement of Science at the Buffalo Meeting.

This address has also appeared in *Science*, August 28, 1896, and in the *Scientific American Supplement*, September 12 and 19, 1896.

The history of the atomic theory for ninety years would fall into several distinct chapters. One of these chapters, not the least interesting of them, would tell of a very large amount of work, some of it of consummate accuracy, of which the object was to attain some knowledge of the nature or construction of atoms. Since the last meeting of our Association in this city, work has been accomplished which, if I rightly judge, has ended this particular chapter. That the chapter may at some future time be resumed is, of course, not absolutely impossible; but for the present it has come to a definite close. My own interest in the matter suggests, and the coincidence in time now mentioned perhaps justifies, my selection, of this completed chapter in the history of the atomic theory as the subject of the address which our constitution requires of me this evening.

This chapter naturally concerns more intimately the members of the sections of Physics and Chemistry. To these I can hardly hope to say anything not already well known to them; but members of other sections may, perhaps, not be entirely uninterested in an account of the conclusions reached.

Dalton's theory was founded on three facts. These facts are often called Dalton's laws; one of them, because he discovered it; the others because he first recognized their important relations to chemical theory. One of these is the law of definite proportions: in any chemical compound, the ratio of the components is constant, is invariable, is definite. This truth had been recognized by others; it was finally established as a result of the discussion between Berthollet and Proust, a discussion well worth recalling for the dignified courtesy and simple love for truth shown by both the disputants. A second of these laws of Dalton is the law of equivalent proportions: if two elements, which combine with each other, combine also with a third, then the ratio in which they combine with each other (or a simple multiple of it) is also the ratio of the quantities of those which combine with the same quantity of the third. That this was true, at least in some cases, was known before Dalton. The third law is the law of multiple proportions: if two bodies combine in more than one ratio, those ratios are simple multiples of each other. This truth was discovered by Dalton.

These three laws are statements of *facts*. Careful and multiplied experiments have convinced us that, if these statements are not rigorously exact, their deviation from accuracy is less than the accidental errors of the best experiments used to test them.

Perhaps it is worth while to delay for a moment, in order to state to what degree of precision such experiments have been brought. The degree of precision with which any supposed law can be verified depends on the skill of the investigator, on the instrumental equipment available, and on the conditions of the problem. Often the conditions of the problem impose very stringent limitations on the precision of our experiments. For instance, the truth known as Ohm's law has been verified, in the case of metallic conductors, to one part in a million millions; but in the case of liquid conductors, the conditions are such that the precision attainable so far has been only a millionth as much. Huyghens' law, relating to double refraction, has been verified to one part in half a million, and there seems to be no possibility of attaining any considerable increase in the precision of the observations. These are examples of the very highest degree of precision which has been secured in the verification of supposed laws of nature.

The precision which can be attained in chemical analysis, even of the most elaborate kind, is much less than in the cases just mentioned. The determination of atomic weights is the chemical process in which the highest degree of precision is demanded. If we denote the precision of such determination by the words 'good,' 'excellent,' 'admirable,' 'consummate,' then we may fairly say that in a good series of determinations the average difference from the mean of all will be less than one thousandth part of the ratio sought; in an excellent series, less than one three-thousandth part; in an admirable series, less than one ten-thousandth part; and in a consummate series, less than one fifty-thousandth part.

Now the work of Stas was all admirable in precision, and much of it was consummate, and he made experiments expressly intended to verify the law of definite proportions. The average error in this series of experiments was not more than one part in thirty thousand; and his result was, that, if the composition of the compounds examined is not rigorously constant, the variations are too small to be detected. The law of equivalent proportions was verified with the same degree of precision; the accuracy of the law of multiple proportions has been thought to be deducible from the truth of the two other laws.

To some such degree of precision, then, Dalton's laws are the expression of facts. With these facts for a guide, and with no theory founded on the facts and explaining the facts, all chemical computations could be made, and chemical formulæ could be established. And, if a theory should be devised, and accepted, and finally overthrown, these facts would remain, unchanged for our perpetual guidance. Some of Dalton's contemporaries accepted the facts as a sufficient guide, and refused to burden them with the weight of the theory. Some were engrossed, for the time, in following out practical consequences of the facts; some distrusted conclusions supported by but a single line of evidence; some, perhaps, distrusted the capacities of the human mind. But the facts were accepted.

All scientific men, all sensible men, have a great respect for facts. Perhaps one cannot have too great a respect for facts; but his respect may be wrongly directed. Facts are often very interesting in themselves; they often have an important relation to human welfare; their discovery is often a great intellectual triumph; and we may regard them as the miser regards his gold, forgetting that the most precious use of facts is to help us to see beyond them. Facts are evidence; but we seek a verdict. Facts are a telescope; we desire enlargement of vision, further insight into nature. Facts are openings which we laboriously hew in the walls which shut us in; they cost enough to be valuable, but their real value is in that which they promise or disclose. Facts are a foundation for our building; the structure must rigorously respect the lines of the foundation; but it is a pity to believe that the basement walls are the chief beauty desired by the architect or owner. As Tyndall phrased it in a lecture at Manchester, "Out of experience in science, there always grows something finer than mere experience. Experience, in fact, only furnishes the soil for plants of higher growth."

In the present case the soil was fertile, the finer growth has been rapid and vigorous. Dalton inferred that chemical elements consist of very small units or individuals; that all the units or individuals of any given element are equal in weight; and that combination takes place by the grouping together of different units or individuals. This is Dalton's atomic theory.

In Dalton's time there was no fact opposed to this novel conclusion; but there was no second set of facts to support it. The progress of chemistry depended on making due use of Dalton's three laws, and they were quickly and generally accepted; but whether the hypothetical chemical units or individuals actually exist or not, although a most interesting question, did not press for instant decision. Most chemists regarded with favor the idea of the actual existence of the chemical units or individuals. Dalton called them atoms, and perhaps the name brought misfortune; for many thought that the new theory was, that matter is made up of units or individuals which cannot be divided by any possible force. The word 'atom,' the word 'indivisible,' like the word 'individual,' properly mean that which is not divided in the phenomena considered. An absolutely indivisible atom, like an irresistible wave or an immovable rock, can be spoken of to puzzle children, but for adults, as Clifford said, "If there is anything which cannot be divided, we cannot know it, because we know nothing about possibilities or impossibilities; only about what has or has not taken place." I judge that many, probably most chemists and physicists understand the word atom correctly; many others understand it to mean that which cannot be divided by any possible force, and so misunderstand it. For instance, the author of the 'History of the Inductive Sciences' failed to understand the word as chemists and physicists understand it, and so supposed that he rejected the atomic theory. Many chemists would reject the theory that matter consists of very small units which *cannot* be divided. I suppose that very nearly all believe that matter is made up of small units which are not divided in any chemical or physical change yet observed. This is the atomic theory of Dalton.

A few years after Dalton had formed the atomic theory, and had obtained the first experimental evidence on a matter which had enlisted attention for more than two thousand years, Davy showed, by brilliant experiments, that certain bodies were compounds, although they had resisted all previous attempts to decompose them. Since the first use of electricity had so important results, men were ready to suspect that even supposed elements might ultimately prove to be compounds. It was therefore in a congenial soil that Prout's hypothesis took root. Trusting to experiments of not much accuracy, Prout suggested, in the year 1815, that probably the atomic weights of other elements were divisible, without remainder, by the atomic weights of hydrogen; or, in other words, that they are whole numbers, if the atomic weight of hydrogen be taken as unity.

The new suggestion was most attractive, for two reasons: On the one hand, the truth of the new suggestion would lead to a very great practical advantage. The labor of determining atomic weights would be immensely simplified and lessened if we could know beforehand that the numbers to be found were integers. And, on the other hand, the new suggestion, if approved, would promise a most interesting and valuable hint as to the nature of matter and the structure of atoms. If, for instance, the atoms of carbon and nitrogen and oxygen weigh precisely as much as twelve and fourteen and sixteen atoms of hydrogen, then it is a very plausible hypothesis that each of these atoms is really composed of the material of twelve and fourteen and sixteen atoms of hydrogen, compacted into a new atom. Davy had led many to suspect that perhaps some atoms might be compound, and the new suggestion, looking in the same direction, was received with favor by many, among whom were great discoverers, and great experimenters, and great teachers of chemistry. In England, where Davy and Prout both lived, Thomson had great influence. It was Thomson who, in the *Journal of Chemistry*, of which he was the editor, first announced Dalton's discovery. Thomson wrote the history of chemistry. Thomson's 'System of Chemistry' was thought worthy of translation into French at a time when French was the mother tongue of chemistry. And Thomson accepted Prout's hypothesis as probably true. But Turner made more accurate and more numerous determinations of atomic weights than any other English chemist; and he rejected Prout's hypothesis. Berzelius, the great Swedish chemist, whose determinations of the atomic weights of all the elements then known were regarded with so much admiration by all chemists, pronounced Prout's hypothesis a pure illusion. But Dumas, than whom none in France stood higher, whose opinion had great weight on account of the excellence of his many determinations of atomic weights, accepted Prout's hypothesis with a slight modification, and believed that his experiments had established its truth. Stas, the distinguished pupil of Dumas, began his work with a bias in favor of the hypothesis; but when his first series of admirable determinations of atomic weights was published, he pronounced the hypothesis a pure illusion, entirely irreconcilable with the numerical results of experiment. But Mallet, who has made several excellent determinations of atomic weights, and Clarke, who has recomputed and reduced to order all the published determinations, declared themselves forced to give Prout's hypothesis a most respectful consideration. It is obvious, then, that ten years ago it was not finally settled whether the hypothesis was or was not true.

The hypothesis, then, has disappointed our hopes of any practical advantage in conducting to a knowledge of the exact value of any atomic weight. But nevertheless the hypothesis has not been neglected. As was said, if it is true, we may expect from it new insight into the nature of atoms. Accordingly, an immense amount of labor has been expended in attempting to determine whether the atomic weights of certain elements are or are not divisible without remainder by the atomic weight of hydrogen. Now since our last meeting in this city results have been attained which show that further effort in this direction is not justified by the hope of any theoretic advantage. The chapter has come to an end. Prout's hypothesis cannot be proved by experiment.

When we attempt to decide by experiment whether Prout's hypothesis is true, the nature of the problem, and the limitations of our present knowledge and of our available manipulative skill, impose three conditions to which we must conform.

In the first place, we can more readily test the correctness of Prout's hypothesis by determinations of the smaller atomic weights. The reason is obvious. All analytical work is affected with some accidental error or uncertainty. When Herschel wrote his admirable 'Discourse on the Study of Natural Philosophy' he said that it was doubtful whether we could depend on the result of a chemical analysis as having an uncertainty less than one part in four hundred. Work of much greater accuracy has been done since this statement was made; but, for the moment, let us assume that, even now, the uncertainty of a determination of an atomic weight is a four-hundredth part. This uncertainty affects a large atomic weight much more unfavorably for our purpose than it affects a small atomic weight. For instance, Stas found the atomic weight of lead to be 206.91, if we take the atomic weight of oxygen as 16.00. The assumed uncertainty, one four-hundredth part of this, is 0.53; so that, on our assumption, the true value is somewhere between 206 38 and 207.44. These numbers differ more than a unit; no one has a right, on this showing, to assert that true value is the whole number 207.00, nor that it is not so.

But a small atomic weight may be much less unfavorably affected by the same proportionate uncertainty. For instance, recent determinations show that the atomic weight of oxygen is 15.88 when the atomic weight of hydrogen is taken as unity. The assumed uncertainty, one four-hundredth part of this, is 0.04; so that, on our assumption, the true value is between the limits 15.84 and 15.92. These numbers differ by only one twelfth of a unit; and both of them differ much from the nearest whole number, 16.00. It is, therefore, by the determinations of small atomic weights that we may hope to decide the truth of Prout's hypothesis.

But among the smaller atomic weights, some, in the present state of our knowledge, can be more accurately determined than others. Accordingly a second condition imposed on us by the limitations of our knowledge is that we must determine, with what precision we can, those small atomic weights which admit of the maximum of precision. There are eight atomic weights upon which, with the experimental data now available, the decision of the matter may be fairly made to depend. These elements are lithium, carbon, nitrogen, oxygen, sodium, sulphur, chlorine and potassium; the atomic weights are, in round numbers, 7, 12, 14, 16, 23, 32, 35.50 and 39. If numerous and careful experiments show that these atomic weights are whole numbers, Prout's hypothesis has a solid basis in fact; if seven are whole numbers and the other is 35.50, then Dumas's modified statement of the hypothesis has a solid basis in fact, for 35.50 is divisible without a remainder by *half* the atomic weight of hydrogen.

One more condition is imposed on us by the limitations of our knowledge and manipulative skill. Our experiments determine most atomic weights, not with reference to hydrogen, but with reference to oxygen. Experiment, for instance, does not determine directly that the atomic weight of lithium is seven times that of hydrogen, but that it is seven sixteenths that of oxygen. If the atomic weight of oxygen is uncertain, the atomic weights of the other seven elements with reference to hydrogen, are all uncertain in the same proportion, although with reference to oxygen they are now determined with very small uncertainty. Accordingly the third condition imposed on us in attempting to learn the truth about Prout's hypothesis is that the atomic weight of oxygen must be well determined.

It may be remarked that it would be a great gain, as all chemists will see, if several other atomic weights could be determined by direct comparison with hydrogen, provided the precision attainable was of the degree which I have called admirable, or even excellent. Now, methods have been devised by which the atomic weights of lithium, sodium and potassium, as well as of several other metals, could be referred directly to hydrogen, by experiments which present no great difficulty and which are capable of the required precision. Further, a method has been devised by which the atomic weight of chlorine can be determined with direct reference to hydrogen, by experiments capable of the required degree of precision, but involving considerable difficulty in manipulation. But, until some such methods shall have been employed by some one, we must be content with the inferences which can be drawn from data of the kind now available, which depend on our knowledge of the atomic weight of oxygen as the corner stone of the system.

Our knowledge of the atomic weight of oxygen ten years ago depended largely on the experiments of Dumas. His results differed from the whole number 16.00 by one four-hundredth part; he himself judged that the uncertainty remaining might be one two-hundredth part. If we accept this estimate of uncertainty, we may say that he proved that the atomic weight of oxygen is included between the limits 15.88 and 16.04. No one could assert that the true number is, or that it is not, the whole number 16.00. A proportionate uncertainty, therefore, existed in the other seven atomic weights just mentioned. Accordingly, ten years ago we could not well discuss the question whether these atomic weights were divisible, without remainder, by the atomic weight of hydrogen.

The atomic weight of oxygen is, accordingly, doubly important for our purpose. The atomic weight is a small one, well adapted to aid in the solution; and, further, many other atomic weights, also well adapted to aid in the solution, depend on a prior knowledge of this constant. It is for this twofold reason that the work done since our last meeting at Buffalo is important and interesting. The members of this Association have not failed to take upon themselves a fair proportion of the considerable labor involved.

Since that time not less than ten or eleven independent determinations of the atomic weight of oxygen have been successfully concluded.

Cook and Richards were the first to complete and publish their result; they used a new and ingenious process. Keiser was next; he employed a method for weighing hydrogen which he had independently invented (though it had been previously invented elsewhere) which is the best yet used. In both these series of experiments the hydrogen was combined with oxygen by manipulation something like that of Dumas; but the improvement which permitted the direct weighing of the hydrogen made the essence of the process novel. Then Noyes devised a new method of weighing hydrogen directly, and a new manipulation for combining it with oxygen, and carried out the process in an apparatus having the advantage of great simplicity. Further, since our last meeting the Smithsonian Institution has published a work containing three series of determinations of the value in question.

In England, Lord Rayleigh used another novel method of combining oxygen and hydrogen, in which he weighed both elements in the form of gas. He also made two series of determinations of the ratio of the densities of the gases. Scott determined the ratio of the volumes of the gases which combine, in several series of experiments of great accuracy. Dittmar and Henderson rendered an important service by repeating, with many modifications, the experiments of Dumas; with the advantage which the later experimenter commonly has over the earlier, they were able to secure a much higher degree of precision and to eliminate the sources of constant error which Dumas detected too late.

In France, Leduc repeated the experiments of Dumas, and also determined the ratio of the densities of the two gases.

In Denmark, Thomsen has applied a different process, in which the atomic weight of a given metal is compared with those of oxygen and of hydrogen successively.

We have, then, eleven series of determinations of the atomic weight of oxygen. One of these, for reasons which, so far, are chiefly matter of conjecture, differs much from the mean of all the others. These other ten are concordant; they differ, on the average, only one part in twenty-two hundred from their mean, and the greatest difference from the mean is about one part in a thousand.

Since these experiments have been made by different processes, by different men, under varied conditions, and since the greatest difference from the mean of the whole is only one part in a thousand, it is probable that the mean of all differs from the truth by much less than one part in a thousand. The errors of our experiments are of two kinds—accidental and systematic. If we shoot a hundred times at a mark, about half of our shots fall a little to the right and about half a little to the left. These are accidental errors; accidental errors are lessened as our manipulation improves, and they but slightly affect our final mean. Systematic errors affect all our results in the same direction. Suppose we fire a hundred shots at a target one thousand yards distant, not examining the target till the shots are all fired. If, now, the sights of our rifle were set for five hundred yards, all our shots would strike too low. This is a systematic error; systematic errors diminish as our knowledge increases.

Accidental errors can be rendered harmless by taking the mean of numerous determinations made by the same method. But systematic errors must be detected and avoided. That they have been detected and avoided in any given case can never be definitely known; it can, at best, be presumed from the fact that experiments by different methods give the same result.

As to the atomic weight of oxygen, accidental errors have now been fairly eliminated, and we can make definite numerical statements on this point. If each of the ten sets of experiments were to be repeated, with the same skill and knowledge, there is not one chance in a thousand that the new mean would differ from the present mean by as much as one part in sixteen thousand. Again, if ten new sets of experiments were to be made by new methods and new experimenters, there is not one chance in a thousand that the new mean would differ from the present mean by as much as one part in twenty-five hundred.

As to possible systematic errors, modesty in statement is incumbent upon all scientific men. But we have now ten independent results in which the difference from the mean is at most only one part in one thousand. We may then fairly assume that the systematic error of the mean is less than one part in one thousand. Again, we have lately been able to take one step in advance, which throws needed light on precisely this point. It has been found possible to weigh some hydrogen, to weigh the requisite oxygen, and to weigh the water which they produce. If, now, there were some undetected systematic error in weighing either one of these three substances, occasioned, for instance, by some impurity remaining undetected in one of them, the sum of the weights of the hydrogen and oxygen would differ from the weight of the water produced. If a pound of sugar and a pound of water produce only one pound and three quarters of syrup, there was a quarter of a pound of sand in the sugar. Now it has, I think, been proved that, if the sum of the weights of the hydrogen and the oxygen is not precisely equal to the weight of the water produced, the difference is too small to be detected, and cannot be more than one part in twenty-five thousand. If there really were a difference of this amount, and, further, if this difference were due to an error at the precise point where it would be the most mischievous, it would render the atomic weight of oxygen uncertain by one part in about twenty-eight hundred.

Taking into account the presumption from the concordance of the results of different experimenters and the presumption from the agreement just mentioned, I think we are justified in assuming that the remaining systematic error is not more than one part in sixteen hundred, and that it probably is not more than one part in three thousand.

If this is a reasonable assumption, the net results of the experiments made in Denmark, France, Great Britain and the United States is that the atomic weight of oxygen is between 15.87 and 15.89, and that probably it is between 15.875 and 15.885. By no stretch can we imagine that the truth lies in the whole number 16.00, nor in the even fraction 15.50. We cannot sanely believe it to lie in the number 15.75, having modified Prout's hypothesis into the new statement that all atomic weights are divisible, without remainder, by one *quarter* of the atomic weight of hydrogen. It will be obvious that, if we are still resolved to accept some form of the attractive illusion, we must assume that the true divisor is as small as one eighth of the atomic weight of hydrogen, for the value 15⅞ is included within the limits given.

Then there is one small and well determined atomic weight which utterly refuses to support Prout's hypothesis or any modification yet stated by believers in the hypothesis. Further, now that the atomic weight of oxygen is well established, we can compare, with hydrogen taken as unity, the seven other small and well determined atomic weights which have been mentioned.* We see that every value differs from an integer; for lithium, nitrogen and potassium the difference is about one part in two hundred thirty; for sodium, sulphur and chlorine, about one part in one hundred eighty; for carbon and oxygen, about one part in one hundred thirty. On the average, the values, which are the best determined in chemistry, differs from the whole numbers by about one part in one hundred eighty. There is less than one chance in a thousand that these numbers can possibly be so much in error. These are the numbers best fitted to test Prout's hypothesis, and their evidence against it is decisive.

It ought to be added that the evidence against Prout's hypothesis seemed to many to be decisive, even without the knowledge of the atomic weight of oxygen which has recently been acquired. But the evidence can now be stated in a much more direct and simple manner; and it has gained in force, for to the seven fit instances at hand before there is added an eighth, which happens to be the most weighty of the whole.

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*The values are as follow: Li=6.97, C=11.91, N=13.94, O=15.88, Na=22.87, S=31.83, Cl=35.19, K=38.84.

In order to present the evidence against Prout's hypothesis when we lack an accurate knowledge of the atomic weight of oxygen, we have first to assume this value. We may, for one trial, assume that this value is the whole number 16.00, which is required by Prout's hypothesis, and see whether, on this assumption, the other seven atomic weights in question are very nearly such as the hypothesis requires.* But the average deviation from the numbers required by the hypothesis is one part in five hundred, and one deviation amounts to more than one part in three hundred. We may make another trial by assuming for oxygen, not the whole number 16.00, but that value which shall make the sum of all the deviations the least possible; and we may also take one quarter of the atomic weight of hydrogen as our divisor.† But the average deviations from the numbers required by the theory is, even in this case, one part in six hundred and the atomic weight of that element for which the determinations of friends of the hypothesis agree with those of its opponents to one part in thirty-five hundred, is supposed, after all, to be in error by one part in five hundred. The atomic weight of oxygen, computed expressly to give every possible advantage to the hypothesis, differs from the whole number required by the theory by one part in two hundred fifty.

We read in our school books of the bed of Procrustes, to which the tyrant fitted his compulsory lodgers; if they were too short he stretched them on the rack; if they were too long he lopped off the superfluous length. This fable was really a prophetic vision; the bed is Prout's hypothesis; our friends who admire it want to stretch the most unyielding quantities, and to lop off numbers which have been determined with the greatest precision. Either the experiments are in error by an amount which seems incredible, or the hypothesis is an illusion. If the supporters of the hypothesis would avoid the conclusion, they must supply better determinations, or they must detect real and tangible sources of error in those already made.

The hypothesis was most interesting and attractive; it promised, if sustained by experimental evidence, to give the means of such insight into the nature of the matter and into the intimate structure of atoms that it was well worth all the attention which has been given to it. That it should fail of support, that its promises could not be kept, is a matter of regret; but it is time to recognize that our hopes are quite cut off. That other elements are composed of the same substance as hydrogen may or may not be true, but we have now no hope of proving it by determinations of atomic weight. It would not be difficult, perhaps, to modify Prout's hypothesis again and again, so as to bring it into some accord with the facts. We may imagine, if we will, that the observed numbers, if determined without error, would all be divisible by the eighth part of the atomic weight of hydrogen, or the ninth, or the tenth, or by some smaller fraction. But such a hypothesis is of no interest and of no utility, because it is incapable of proof or disproof by experiment. The reason is obvious. If we suppose that all atomic weights are divisible by one-tenth of the atomic weight of hydrogen, then, in case the theory is erroneous, the average deviation of the actual atomic weights from those required by the theory is only the fortieth of the unit. The man who supports a theory which has no physical basis would assert that all such ascertained deviations were due to errors of experiment. Others would reply that you cannot prove that a man is a good marksman by crowding the targets so near each other that not even his random shots can miss them all. But his backers might make so uncritical a claim.

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*The values on this assumption are as follows: Li=7.02, C=12.00, N=14.04, O=16.00 (assumed), Na=23.07, S=32.04, Cl=35.46, K=39.14.

†The values are as follows: Li=7.00, C=11.96, N=13.99, O=15.94, Na=22.96, S=31.96, Cl=35.33, K=39.00.

No, Prout's hypothesis, if subdivided far enough, may be true for all which can be proved with the balance; but in such new form it is of no use and of no interest, for it cannot be proved so as to become a safe basis for further inference. In its present form there is no root of truth in it.

So far I have argued that Prout's hypothesis is not true as heretofore enunciated, and that, if some further modification of it is true, we cannot know it. This conclusion has been sustained by the evidence of the chemist's balance. A conclusion supported by a single kind of evidence may command the confidence of one who has been long familiar with the evidence and who has become capable of weighing it. But for others the concurrence of evidence of different kinds rightly adds greatly to its cogency. In this case there is such concurrent evidence. There is other proof that the atoms of some well studied elements are not *additive* structures. Let me briefly describe the nature of this evidence.

When certain elements are volatilized in a colorless gas flame, or in the electric arc, their molecules are made to vibrate, so as to produce light. By the study of this light we can in time learn much of the nature of the vibrating system. The observed facts are gradually reducing to order, and one result is very striking. In the case of three closely similar elements before mentioned, lithium, sodium and potassium, the complexity of vibration is precisely similar in all, and the numerical relations among the component vibrations are precisely similar in all. Therefore we are compelled to assume that the complexity of structure is the same in all, and that the relations of the component parts, and of the forces acting between them, are the same in all. To illustrate the nature of the argument: the complexity of vibration and the numerical relations among the component vibrations in the case of a large church bell are precisely similar to those in the case of a bell only one-third as large. Then, even without the direct evidence of other senses, we must presume that the two bells are similar structures, having similar parts, similarly related. We cannot believe that the larger bell is made of a small bell loaded with weights, nor of three small bells bound closely together. The larger and the smaller are of the same order. The larger is not made of more *parts* than the smaller; it is made of more *metal*. So with the atoms of these three elements; the larger are not made up by the addition of parts which preserve their identity and remain undivided. But all we know of chemical combination relates to structures which are made by the addition of parts which preserve their identity and remain undivided. Then Prout's hypothesis assumes an analogy which does not exist; and deductions from an imaginary analogy will themselves differ from the truth, much as fairy tales differ from history.

There are still other sources of evidence drawn from the specific heats of the elements; the evidence is of the same kind and leads to the same conclusion, but I simply allude to it.

It seems to me, then, that the exact quantitative similarity of the spectra of these elements shows that they are not compounds one of another, subject to the great chemical law of the addition of undivided parts; and that also the magnitudes of the small and well determined atomic weights differ from the values hitherto suggested by applying the law of the addition of undivided parts, and differ by five, ten and fifteen times the greatest experimental error we can reasonably assume.

So the citadel which defends the secret of the atom cannot be taken by way of Prout's hypothesis. We have carried on the assault for eighty years, and we are now satisfied that the way is blocked; we tried to breach, not a wall, but the solid mountain itself. We shall doubtless learn the structure of the atom, but we cannot learn it in the way we hoped. This chapter in our study of the nature of atoms has been fully ended.

If Prout's hypothesis cannot serve us, you will doubtless ask what other ways are open by which we may learn something of the structure of atoms. To answer is difficult; to answer adequately is impossible. Perhaps I may mention four lines in which it has been hoped by some that the desired advance could be made, and may indicate what it is reasonable to expect of each.

One of these indications of a possible source of knowledge as to the structure of atoms was suggested by certain chemical observations on some of the rare earths. My brief explanation will not do justice to the conception of the eminent chemist who investigated the phenomena. As I have said, the atom is something which, as a matter of fact, remains undivided in all chemical changes. Most atoms seem to resist every force which we can apply. But it is possible that the amount of resistance which they can offer may vary greatly; it may be that in the case of some elements the resistance is such that in some reactions the atoms remain undivided, and not in others. From the study of such cases, if there are such, we might expect much help. Now in the case of the common and well studied elements, the occurrence of such cases has not been suspected; but some of the rarer elements, examined by a process which is frightfully laborious, have exhibited phenomena which suggest, as a hypothesis to be further studied, such a subdivision of atoms. But it is probable that we have mixtures of distinct elements which we do not yet know how to separate from each other by simple analytical processes. This chapter, we may fairly presume, will be valuable; but not because it will tell us anything about the structure of atoms.

Certain spectroscopic phenomena have suggested that some elements may be decomposed by the action of a high temperature. For instance, it has been thought not impossible that, at the temperature of the electric arc, potassium compounds quite free from sodium should begin to show the spectrum of sodium, because at this temperature potassium is decomposed so as to produce sodium. This hypothesis has been carefully investigated; in part, by the accomplished physicist who is its author; in part, at his suggestion and invitation. It is found that, if years are given to the preparation of potassium compounds free from every trace of sodium, then it is impossible to obtain from them any phenomena suggesting a decomposition into sodium. Here, again, the new chapter, as far as it relates to the structure of the atom, is likely to be but short.

A third suggestion did not rest upon any observed chemical phenomena, but was a purely intellectual creation. This is the hypothesis that atoms are vortex rings in a frictionless fluid. It belongs to the mathematical physicist, rather than to the chemist, to discuss this interesting suggestion. It may be said that it has seemed not impossible that the chemist should find a vortex ring capable of exerting certain chemical forces. But the fate of the hypothesis rested, not with the chemist, but with the mathematical physicist; and it has been found that the theory demands that the weight of a body composed of vortex atoms should increase with rise of temperature. It is scarcely possible that this can be the fact; if, then, the mathematical and physical reasoning involved is sound, it is scarcely possible that atoms consist of vortex rings. The probability is, therefore, but small that we are to learn of the nature of atoms by means of this hypothesis.

Some spectroscopic and other optical phenomena seem to promise more light as to the structure of molecules and atoms, though the dawn is not yet. Thanks to the concave grating, we can determine the frequency of vibration of the light from any source with great accuracy. When the light is complex we can determine, with great accuracy, the relative frequency of the component vibrations. In the cases which have been best studied, the observed frequencies have been reduced to rather simple numerical relations. From the study of these relations we may expect, in time, to determine the structure of the vibrating systems. But the way is long and difficult.

Let us illustrate the nature of the method by means of a familiar example, namely, by the study of the structure of a sonorous vibrating system by means of the study of the sonorous vibrations produced by it.

Let us suppose a person deprived of the sense of hearing, but master of the whole mathematical theory of sound. Suppose, further, that he has an instrument which will do for sound what the spectroscope will do for light. With this instrument, let him observe the frequency and the relative intensity of the vibrations produced by certain musical instruments which we cause to vibrate for him, but withhold from his inspection. Let us, first, sound for him a single note on a piano. The vibrations produced are, as you know, somewhat complicated. Our imagined experimenter, with his instrument, observes vibrations whose frequencies are 100, 200, 300, 400, 500 and 600 in one second; and he also observes that the vibrations of 100 and 500 are of nearly equal intensity, that the vibrations 200, 300 and 400 have more than twice as great an intensity, and that vibration 700 is very feeble. From these facts, if his attainments are sufficient and his imagination sufficiently fertile, he can determine what system produced the sound. He imagines every possible vibrating system—drum, cymbals, trumpet, flute, organ-pipe, harmonium-reed, violin-string, piano, harp and more. Next, assuming each imagined system of such size or tune as to produce one hundred vibrations a second for its gravest tone, he computes what other vibrations will also be produced and what the intensity of each. He finds, for instance, that a closed organ-pipe will give only the frequencies 100, 300, 500, but will not produce the other observed frequencies 200, 400, 600. Therefore, he concludes, the sound we produced for his study is not due to a closed organ-pipe. He finds, after many trials, that the observed frequencies and intensities could be produced by striking a stretched cord with a soft hammer, at a definite point near the end of the cord, so quickly that the cord and hammer remain in contact about the six-hundredth part of a second, and that the observed phenomena could not be produced by any other of the imagined vibrating systems. Then he concludes that the observed sound was probably produced by the stretched cord of a piano. He will have detected the true system, by first imagining every possible system, by computing the frequencies and corresponding intensities due to each hypothetical system, and by then comparing computation and observation.

For a second example, suppose we ring, for our imagined observer, a bell of a certain form, and that he notes the frequencies 200, 475, 845 and 1295 in one second; in which, also, he finds that the vibration 845 so predominates as to give its pitch to the compound tone. Our observer will not be able to refer this sound to any stretched cord, or to any organ-pipe or other wind instrument; for all these are limited to frequencies contained in the series 200, 400, 600, 800. A uniform metallic bar, suspended and struck like the triangle of an orchestra, will give frequencies not contained in this list, but they will be 200, 550, 1080, and 2670, instead of 200, 475, 845 and 1295. But if our observer has adequate powers he will imagine a hemispherical bowl of suitable dimensions, and will in imagination, add mass and rigidity in suitable places, until, in time, he will have devised a system whose computed vibrations agree in frequency, and in distribution of energy, with those of the invisible sounding body. Then he would conclude that the observed sound was due to a bell of the form assumed in the successful computation.

This illustration sketches, imperfectly, I fear, the laborious method by which we may learn the structure of a vibrating system from a study of the vibrations produced by it. When we attempt to use this method in order to learn something about the structure of molecules and atoms, our powers of imagination and our mathematical skill are none too much. We know but little which can suggest plausible hypotheses. The facts which are to be explained have been but recently reduced to order. Accordingly, little has been actually accomplished. But there are some few examples of the use of this method of studying the structure of molecules and atoms.

In one such example the structure imagined consisted of a system of concentric spherical shells, each connected with the adjacent shells by springs. This complicated structure admits of relatively simple computation, and was taken because it fairly well represents a rather simple imagined structure, for which, however, computation is difficult. But it was found that the results computed on this hypothesis gave little promise of agreement with facts.

This was a dynamical hypothesis; it suggested, not only vibrations, but the forces which were to produce them. A second example suggests certain possible motions, but not the forces which might produce the hypothetical motions; it is not dynamic, but kinetic.

As we know, many of the lines in the spectra of the elements are double. For instance, when a volatile compound of sodium is brought into a colorless gas flame, this is colored yellow. When we examine this yellow flame with a spectroscope of sufficient power, we see that there are two frequencies, differing from each other by only one part in a thousand. Now it is probable that these two frequencies are due to the vibrations of one and the same body. There are many illustrations of the fact that a given body may perform two different vibrations whose frequencies differ but slightly. For instance, if we suspend a ball by means of a chord and let it oscillate as a pendulum it is well known that a swing of six feet takes a little more time than a swing of three feet. Suppose, then, that we let our ball swing six feet north and south, and also three feet east and west at the same time; the two motions may be combined so that the ball moves in an ellipse—an ellipse whose longer axis is north and south. If the longer and the shorter swing had precisely the same frequency, the axis of the ellipse would continue in this direction; but since the frequencies differ, the ellipse slowly revolves. Conversely, from the revolution of an ellipse, we should infer a difference of frequency in the two component vibrations. So it is suggested that the two slightly different frequencies in the light sent out by ignited sodium are due to an elliptic motion in the molecule in which the elliptic orbit slowly revolves; this suggestion has not yet been carried so far as to specify any hypothetical cause for the revolution of the ellipse.

These two examples, both due to eminent English physicists, may serve to illustrate the method by which, if I am not mistaken, we are not unlikely to learn much as to the structure of molecules and atoms. We must not expect rapid progress. Even comparatively simple hypotheses may require, for their due examination, the invention of new mathematical methods. And useful hypotheses are rare: like the finding of buried treasures, they are not to be counted on. But, since Prout's hypothesis has rendered us its final service, new hypotheses must be devised, competent to guide us further on our way. Let us hope that, before this city again honors our Association with its invitation to meet here, American chemists and physicists may have had some honorable share in such new advance.

THE INTELLECTUAL DEVELOPMENT OF CLEVELAND.

It is nearly one hundred years since Moses Cleaveland with his company of fifty surveyors and emigrants began to build their log cabins upon the banks of the Cuyahoga. Who were these men? Distance lends enchantment, and it is not difficult for a sentiment to paint the lily and add fresh perfume to the rose. But in reviewing the intellectual life of our city, we must endeavor to represent the earliest pioneers undisturbed by the glamour of time. With very few exceptions they were scions of old Connecticut, yet they do not fit into that majestic frame which we are so accustomed to throw around the portrait of the Puritan. The imperious theology and the religious zeal that characterized their fathers no longer swayed the minds and hearts of the children. We are apt to forget the mighty changes wrought in the life and thought of New England in the last quarter of the last century. It was the period of the revolution, and revolution is always renaissance. Puritanism had done its work and all its rocky outlines seemed to disappear in the rising tide of religious and political liberalism. The French *Illuminati* had been long in the field and the spirit of two revolutions brooded upon the chaotic elements of our republic. It seemed as if old things were passing away and all things becoming new,—so it seemed to Church and State, as they beheld the course of "the Corsican Child." It was the age of Franklin, and John Adams, and Jefferson, and Paine. It was an age of political idealism and of violent reactions in religion. The Church waned in power as the new State arose. Education and its institutions began to pass from the hands of the Clergy to those of the State. " Nowhere in America had this spirit penetrated more deeply than in Connecticut. Although her clergymen were largely instrumental in securing the adoption of the Constitution of 1789, and with it "a free Church in a free State," they beheld with consternation a rapid disintegration of current religious beliefs. The College Church at New Haven was almost extinct. In 1795, when Timothy Dwight became president of Yale College, there was but one Christian in all the body of students. In this brief but violent period of transition the Western Reserve was pioneered, and the actual background of our picture is not Puritanism but Revolution. We must not think it strange therefore if we do not find that piety and sobriety in our local beginning which we so fondly attribute to the early fathers. Nor will we be surprised to learn that the first religious service in Cleveland was not before August, 1801, and that one year later the Reverend Joseph Badger expressed an uncomplimentary opinion of the religion and morals of the people. A dozen years later Dr. Robbins thought that the greater part of the New England people in the Western Reserve were "pretty loose characters." Those at Hudson were "dull and unworthy," at Cleveland "loose in principles and conduct," at Mentor "much inclined to infidelity and immorality," at Painesville "not one seemed to have the least regard for the Sabbath," and at Newburg "there was infidelity and profanity." But the ground of the old Puritan character was merely modified not lost and we soon discover it to be the basis of all subsequent constructive development. The period of French liberalism was practically at an end in 1820, and even before this time religious services were held in the school house under the direction of Judge Kelley.

When in December, 1796, the surveyors disbanded, but two persons remained for any length of time upon the spot which had been christened Cleaveland. This nucleus of

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NOTE—Address at the dedication of the Hatch Library Building, June 15th, 1896.

"Greater Cleveland" was Job P. Stiles and his wife. In his cabin the first white child of the Western Reserve was born. Wherever the New Englander went he took his family and his home, and this trait is preserved to us in a city of homes and of family life. On May 2d, 1797, the Carter family entered Cleveland. It came from Vermont and had tarried during the winter in the snows of Canada. If there is but one among the early pioneers whom we, as a city, may call both father and founder, that one is Lorenzo Carter, a man of indomitable will and enterprise—a modern "Nimrod." Like Stiles, he was probably connected with the great fur enterprise of John Jacob Astor, which Irving has characterized in his "Astoria." In Carter's life and work we find the beginnings of Cleveland. Perhaps he was not all one might desire in an ideal citizen of to-day, but in that early struggle for existence with restless Indians, rigorous climate, grudging and malarious soil, discontent and suffering, he was the guiding spirit. His door was ever open and his hand ever ready. His gun brought game to the starving. His courage rescued the perishing. His optimism saw better days ahead. He smiled in the face of difficulties that to most men mean despair. In the early days his word was the only law in the land, and he was literally legislator, judge and hangman. He declared: "No runaway shall leave Cleveland," and on two occasions at least he executed this decree. He was at once the father of our schools, of our ship building, and of our lake commerce. The first school was held in his cabin, and in 1808 Cleveland's first vessel, the "Zephyr," a schooner of thirty tons, was built and launched by him. It would be a fitting tribute to the man and an equitable act on the part of this great city to erect in 1897 a memorial to Lorenzo Carter, the pioneer and founder of Cleveland.

These days of warfare with the wilderness were not wholly without the amenities of life. The song, the game, the dance, the feast, were not strangers. David Bryant, who came to the Western Reserve to make mill-stones, for which there was no demand, in 1800 turned his attention to founding "the little distillery under the hill," for which he thought there was demand. This was Cleveland's first industry, and it seems to have flourished and to have exercised considerable influence in practical politics. It was also the social center of the neighborhood. Here Indians from the forest and settlers from Newburg and Doan's Corners and Euclid met to barter, and to exchange items of interest. Here was the center for festival and holiday, when youths and maidens tripped merrily to "Hie Betty Martin" and drank wheat whiskey and water sweetened with maple sugar. Thus the years of small beginnings rolled or dragged on,—how slowly is realized when we remember that in 1820 the population of Cleveland was but one hundred and fifty, not as many persons as there are in Adelbert College when all the classes are in session.

Behold the Cleveland of to-day! It is related that when the surveyors of 1796 named this place after their leader, Moses Cleaveland hazarded the prophecy that the time would come when the village would have a population as great as Windham, his native town, which then was about fifteen hundred. It was not until 1832, the year in which the honored and now venerable Truman P. Handy, upon the invitation of George Bancroft, came to Cleveland, that this prophecy was fulfilled. But at the end of another thirty-five years there were more than seventy thousand people on the banks of the Cuyahoga, and at the end of the next thirty, there are three hundred and fifty thousand. The spiritual and material differences between Cleveland in 1796 and in 1896 are so great that comparisons are impossible and contrasts alone are possible. We have even forsaken the Old Testament as an arsenal of names for our children. Adam, Seth, Lot, Abraham, Moses, David, Solomon, Job, and the Prophets,—our fathers, where are they? Perhaps the time will come when some clever historian will prove beyond question that the remnants of the lost tribes of Israel found their resting place in New England, or that the Hebrews of our city are the real descendants of the pioneers of the Western Reserve. The log cabins and the wilderness have disappeared, and in their place stands the tenth city of America, with its world-wide interests and relations. A city first in ship building on this continent and the second in the world; a city operating more than five thousand miles of railroad; a city of manufacturing plants which, with machinery and tools, represents nearly twenty-eight millions of dollars, giving employment to 55,070 persons and paying annually in wages and salaries $33,032,636, taking sixty-five million dollars' worth of raw material and transforming it into one hundred and thirteen million dollars' worth for the markets of the world; a city with forty-five thousand pupils in its public schools and with two hundred thousand volumes in its library; a city with one hundred and ninety-five churches, with a university of five departments, and a school of applied sciences second to none in the country; a city with two schools of art, and with a million dollars in hand for an art gallery; a city already realizing a public park system surpassed by none in America; a city numbering among her citizens men of business, of science, and of literature known throughout the world.

What is it that has wrought these marvelous changes within a period of one hundred years? What is it that has made Cleveland what it is? This question is highly relevant, both to our subject and to the occasion. The answer will throw light upon the duties of the present and guide our expectations of the future. It is the *Mind* of man conquering his environments and subduing it to his service. It is the mind of man representing to itself the desirable and so modifying and relating the forces of nature that these ideals are gradually realized. Progress lies not in conformity to physical environment, but it does lie in the mind's conformation and transformation of its surroundings. Under the sway of mind, "Nature, red in tooth and claw," becomes benevolent and smiles kindly upon human effort. Under the stress of human tact and intelligence, the malarial marshes disappear and "the desert blossoms as the rose." Before her inquisition Nature gives up her secrets, and her invisible energies are made motor powers in industry and transportation, and carry our messages around the world in the twinkling of of an eye. It analyzes the stars with its spectroscope and plunges deep into the earth for the precious metals. Time and space, those formidable barriers of men, are barriers, as ever, but how changed in meaning. Our fathers came from Connecticut to the Cuyahoga in ninety days. Their children make the journey in fourteen hours. Every morning we read of what the world did yesterday. It is a cardinal truth that "the fundamental facts in economics come from man rather than from things. If a man desires a thing, it has value, no matter whether it costs anything or not, and if he does not desire it, it has no value, no matter how much it cost." The mind builds our cities and creates and controls their varied interests. Mind builds our libraries and fills their alcoves with its own works and literature, in philosophy and in science. Society is its creation and history its expression. Languages, governments, religions, arts rise under its imperious sway. The University springs into existence through its demand for knowledge and for greater power in the field of life. It gives rise to our churches andt our courts, and contemplates every interes from high heaven to lowest depth. It faces resolutely life's most appalling facts,—disease, disaster, disappointment, death, and triumphantly dispells them all by faith in God and in immortality. The cosmos, so far as we can determine, furnishes no ground, no principle of progress; it gives conditions, not causes; occasions not explanations. Every explanation, every construction, every cause, every science, every philosophy, is of the mind.

The cosmos rolls on through time, changeless, yet full of change we say, with nothing permanent but the law of change, and all this is our interpretation; is what the mind reads *into* rather than out of what the eye sees and the ear hears. All laws, all relations, all societies, are psychical. Physiological analysis throws no ray of light upon human nature nor furnishes the remotest suggestion of that marvellous synthesis--the human mind. It may be interesting to know that Plato or Shakespeare was composed of hydrogen, oxygen, nitrogen, carbon, lime, phosphorous, sodium, potassium, magnesium and silicon, but there is another meaning to Plato and Shakespeare, which we miss in this analysis common to sage and beast, and it is this other meaning that is of supreme concern to us:

> "Know, man hath all which nature hath, but more,
> And in that *more* lie all his hopes of good."

Professor Lazarus, of Berlin, has observed truly: "A people which is not rich in ideas, is never rich; one that is not strong in its thinking powers, is never strong" and Dr. Brinton, the learned and acute American, concludes: "The conscious and deliberate pursuit of ideal aims is the highest causality in human history." Think of the history of the human mind in Egypt, in Greece, in modern Europe and in America, and you will observe that the one thing to fear is that our noblest and most inspiring ideals get under our feet, or that the really desirable get lost in the actually desired. Huxley is undoubtedly right in holding that all human progress is at the core ethical, and that there is an actual antagonism between the spirit of man and the cosmic process. This is one of the deepest meanings of human history. This contributes largely to an explanation of the rise and fall of nations, as well as to the real progress of the race under its galling limitations. History furnishes us with prodigal proofs that there are always possibilities of moral and intellectual deterioration.

Can we discern in this sway of mind an empirical law of progress? Can we, in the realm of our experience, indicate one principle that runs through and unites all the varied achievements of the human mind, which we sum up in the word *progress?* I am well aware of the crucial nature of this question; still, it appears to me that such a principle of explanation *is* manifested in the life of the normal individual and therefore in the life of the municipality and of the race.

> "'Tis life whereof our nerves are scant,
> 'Tis life not death for which we pant,
> More life and fuller that we want."

This touches the principle of all progress, life, "more life and fuller," is the demand implied or expressed of every sentient being. In man, this demand gets itself expressed in various ideas and ideals. Human nature is teleological. Man desires and he pictures the desirable; he struggles to realize his ideals. The pioneer, in every department of progress, is the constructive imagination objectifying the desired or the desirable. This explains all community, all competition, and all differentiations in society at large. Out of his initial mental nature, in the presence of heredity and environment, arise man's ideas and ideals of true and false, of beauty and deformity, of right and wrong. The initial unity of mankind remains the salient fact after surveying all the variations of shade and feature in his physical and psychical history. This conscious desire to live, to become and to be, explains all invention and discovery, all arts, all sciences. The institutions—family, property, church, school, and state, are all exponents of the mental life of man in his efforts to reach the desired and the desirable life. This desire explains the presence of our parks, our boulevards, our libraries, our museums,—these too have a meaning for life. Through many a conflict and with many a scar, our city has attained its present high position and is still on the way of progress, but only because her true citizens are animated by larger hopes and higher ends than have yet been realized.

The gamut of our ideals enables us to behold our possibilities. The meaning of life grows and broadens and deepens before us.

"More life, and fuller, that we want."

In view of what has been said, it appears to me that the factors in the intellectual development of Cleveland may be summed up under one or other of three general heads,—the industrial, the theoretical, and the ethical. These sufficiently indicate the three main aspects of our municipal life, and at the same time are somewhat different exemplifications of the principle of progress. Our industrial achievements are the products of the intelligence of our people. Our industries, our commerce, our public and private improvements, are all manifestations of the spiritual qualities of our citizenship. Industry and education have a common ground in the needs of man. Whatever may be our differences of opinion as to the desirability of public kindergardens and manual training schools, there can be no dissent from the proposition that the common school is both a condition and a part of our constructive life. In a free and democratic country it can not be otherwise. It was no accident that Lorenzo Carter was interested in primary education. From the beginning of our national life it was a part of our policy to set aside lands in the various States for educational ends. In this both Puritan and Cavalier were agreed. That remarkable "Congressional Ordinance of 1787," for the government of the Northwest Territory, possibly drawn by the same hand that penned the Declaration of Independence, declares, "Religion, morality and knowledge, being essential to the government and happiness of mankind, schools and the means of education shall be forever encouraged." The convention that framed our State constitution in 1802 laid like stress upon the necessity of common schools. It was the opinion of the founders of our government as well as of the pioneers of the Western Reserve, that elementary education is the foundation of the public weal; and we who are celebrating the centennial of the founding of our city should realize, as did our fathers, how truly public education is the interest and concern of every good citizen. It was in 1802 that Annie Spafford began to teach the children of Cleveland in the log cabin of Lorenzo Carter. In the same year a school was opened in Newburg, with Sarah Doan as teacher, and another was begun at Harpersfield. I do not know to which the pioneer honor belongs, but here are the beginnings of what has come to be the most elaborate and essential institution of our municipal life. Our first school house was built by private subscription in 1814, at a cost of one hundred and ninety-eight dollars and seventy cents, but in 1817 it was purchased by the town. In 1822 the Cleveland Academy, on St. Clair street, was opened, with William McLean as principal. These were the days when the teacher collected his pupils and "boarded round"; the days of the spelling school *a la* Dillworth, of Pike's Arithmetic, and of that patriotic manual "The Columbian Orator." Under this plan primary education was by no means extensive. In 1833, when the town had a population of about fifteen hundred people, a large part of the children were so ignorant as to render Sunday School work impossible. To obviate this, a free day school was opened and continued to be supported by Christian people until 1836, when education began to be supported by public tax. Thus the cradle of our free school system, represented in 1836 by three teachers and two hundred and twenty-nine scholars, was the effort to prepare children for Biblical instruction. On March 14th, 1843, the State Legislature provided a fund for buying maps, books, and apparatus for the public schools. From this fund Cleveland received in 1854, seven hundred and sixty-six dollars and fifty-nine cents; in 1855, eleven hundred and ninety-one dollars and forty-one cents, and in 1856, thirteen hundred and twenty-two dollars. It was from these sources that the public schools received the nucleus of a library. Another important advance was made in 1853, when Mr. R. C. Parsons introduced into the Council an ordinance establishing the office of Superintendent of Instruction. The way was now open for the rapid development of the public school system. It is evident that a living interest in public education must soon manifest itself in the establishment of a public library. To this end legislative provision was made in 1867. The school libraries were brought together, and on February 17th, 1869, with an address by Mr. E. R. Perkins, the public library was dedicated to public uses. The library, now occupying the old Central High School building, contains about ninety-seven thousand volumes.

It is not my province here to dwell upon the prowess of our business men, our bankers, our manufacturers and our merchants, men who direct and control the material advancement of our city, but it is well to remember that these men--children of our public schools--are performing important functions in the intellectual development of the municipality. In one aspect the city is a great laboratory in which experiment and competition are continually active, resulting in improved methods and new enterprises. Here intellect, feeling and will are continually exercised, and self-control and courage developed. This aspect of our municipal life manifests itself in the Chamber of Commerce, which grew out of the Board of Trade founded in 1848. It is an organization of citizens representing every department of our business life. What is its aim? Is the Chamber interested in material prosperity merely? Suppose it were. It must even then recognize that to accomplish this end it must take a far more comprehensive grasp of life. But this organization is directly interested in every phase of municipal progress and there is no question or problem of civic welfare, whether material or moral, educational or industrial, that is ignored in its efforts to realize a healthy and progressive community. It may well be regarded as a school of good citizenship. Let us bring home a little more vividly the complex relations of the good citizen to the community in which he lives. He is not the ideally good, but the actually good citizen of which we speak. His relations are multitudinous. He is the good son, the good brother, the good husband, the good father, he holds his family dearer than himself,—but his relations extend far beyond; he is a member of society and of many smaller associations; he is an officer in the church, interested in the public schools, on the boards of educational and charitable institutions; he is the president or director of some guild for public improvements, or of some banking corporation; he is at the head of some literary club or reading circle, or the trustee of an art school, and in all these relations his influence is directly felt and his work is well done. He makes the world go just because he goes. Undoubtedly selfishness may play a large rôle even here, but it is only because we have had citizens who have interested themselves beyond self in every direction that we have come to our present status, and it is because such are still with us that we have the guarantee of a prosperous future. The worst form of selfishness is complacent selfishness. It dwarfs and kills healthful public sentiment and is always the herald of degeneration. It is this evil spirit that individuals and municipalities must cast out. As I look back over the history of Cleveland, and call the roll of our fathers and benefactors, as I contemplate our citizenship to-day, and the common struggle for a larger and completer life, this truth presses for expression.

It is characteristic of our American life that the struggle for existence has always been accompanied by a theoretical interest in God, Man and Nature. This means that these are the three great categories of our higher intellectual life. One can not read the history of early New England without being impressed with the activity in theology, psychology and natural sciences. This is also true of the pioneers of the Western Reserve. As early as July, 1811, two years after the organization of Cuyahoga County, when Cleveland had a population of less than sixty persons, a club of seventeen persons was effected for furthering the intellectual interests of the town. The names of these persons, with their common aims, should be preserved. The names were Alfred Kelley, James Kingsbury, Lorenzo Carter, George Wallace, Nathan Perry, John Walworth, James Root, Elias Murray, Harvey Murray, Daniel Mather, John Lauterman, William Gaylord, David Long, Samuel Williamson, Matthew Williamson, Abijah Hewitt, and Stephen King. The organization declared for its objects, "the diffusion of useful knowledge, and the acquirements of the arts and sciences, by the establishment of a library of Scientific and Miscellaneous Books for general circulation and a Reading Room, Lectures, Cabinets, and by such other means as may be deemed expedient." During the year ninety-eight dollars were collected and expended as follows: Eighty dollars and thirty-eight cents for books; three dollars for transportation; five dollars for book cases. This organization was dispersed by the War of 1812. In February, 1833, Judge Willey, John W. Allen and Judge Starkweather organized a debating club, called "The Lyceum," to which, in 1835, a reading room was added. In 1836, the year of the incorporation of the city, "The Young Men's (Literary) Association" was organized, mainly for the purpose of collecting a library. It is said that the first scientific lecture in Cleveland was delivered before this Association by Dr. John L. Cassels in 1846. Unfortunately the records of the Lyceum and the Literary Society are lost, but we know that before 1843 about eight hundred volumes had been accumulated by the Literary Association, and that a part of these became the nucleus of a collection that in 1848 was incorporated as "The Cleveland Library Association." In 1849 this Association possessed one thousand volumes, and in 1863 about seven thousand. The history of this Association is a bright feature in the intellectual life of Cleveland. The organization still exists, though commonly known as the "Case Library," because its collection of books is housed in the valuable block given by Leonard Case to the Association in 1875. This act of generosity not only gave the library a room but also an income, at present between fifteen and twenty thousand dollars a year. It was early in 1866 that C. C. Baldwin, whose name must ever be associated with the highest interests of the city, proposed the foundation of an historical society for the preservation of the literature and relics of the Western Reserve. In 1857 the "Pioneer Historical Society" had been founded and some valuable papers collected, but the society became extinct in 1861. In this new effort Judge Baldwin was heartily seconded by that able pioneer of archaeology in Ohio, Colonel Charles Whittlesey. Other names on our honor roll, Joseph Perkins, Leonard Case, W. J. Gordon, joined in the demand, and on May 26, 1867, the society was founded as "The Reserve Department of the Cleveland Library Association." Chiefly through the labors of Judge Baldwin, the society was raised to the first rank and secured its own building on the Public Square. It is now decided to change its location and to break ground for a fifty-thousand dollar building in the educational center of the city.

But we must retrace our steps a little to catch another line of influence that has wrought powerfully in our intellectual life. I say "another line" doubtfully, for it may be that Western Reserve College is the mother of the movement of which I have been speaking. In 1843, upon the dissolution of the "Willoughby Medical School," the College founded a Medical Department with Dr. Jared P. Kirtland, ably assisted by John Delamater, at its head. Through Kirtland's efforts to arouse interest in natural sciences, arose the "Cleveland Academy of Natural Sciences," founded in 1845, three years before the incorporation of the

"Cleveland Library Association." The proceedings of the Academy, from 1845 to 1859, were first published in 1874. In 1869 the "Kirtland Society of Natural Science" was incorporated, but in 1870 it became a department of "The Cleveland Library Association," and in 1893 its valuable collections were distributed to Adelbert College and to the Case School of Applied Science. Through the munificence of Leonard Case, by a deed of trust executed in 1877, the last named institution was founded in 1881, with an endowment now worth about two millions of dollars. It has already become the recognized center of practical scientific interests of the city. It is not necessary here to call the roll of our many scientific societies, but it may not be amiss to note that there is at present a movement to confederate them into an Academy of Science. The interests of this aspect of our municipal life, as well as the interests of each society, seem to urge the realization of this end. It is a service which careful and competent men of science should render their city. It would tend to keep our life broad and progressive, and would give prominence to all our efforts. In the rapid transition from the homogeneous to the heterogeneous, in the growing division of labor, specialization and isolation, it is a sorry thing if the deeper unities and concerns of humanity are not brought more clearly into the light.

But we must glance back once again to the beginnings of the type of intellectual life that demands for its satisfaction the New England College, which gives that broad training in the humanities that forms the beauty and strength of our literature and our life. Efforts in this direction were made by Joseph Badger and Joseph Hudson as early as 1801, and a so-called academy was established at Burton in 1805. It was not until the Presbytery of Grand River took up the cause of higher education in 1817 that broad plans were realized in founding the Western Reserve College at Hudson in 1826. The period of the founding of Western Reserve College is very important as showing the conflict, of the Cavalier and Puritan educational ideals as well as of politics and religion. Western Reserve College became the home of plain living and high thinking, the former at seventy-five cents per week; the latter represented by such men as Loomis, Hitchcock, Bartlett, Hickok, Barrows, Cutler, Seymour, and Ladd. Through the munificence of Mr. Amasa Stone and the labors of our leading citizens, the College was removed to Cleveland and became Adelbert College of Western Reserve University in 1882. Mr. Stone seems to have grasped the situation perfectly. On the one hand, the city of Cleveland desired and was intent upon having a University of its own; on the other hand, the college at Hudson, with a noble history and an excellent faculty, was isolated, struggling for existence, facing a waning patronage and a depleted treasury. No one who is thoroughly acquainted with the circumstances in 1880 and in 1896 can doubt that Mr. Stone's proposition not only gave Cleveland a first-class college but also saved the Western Reserve College at Hudson from an inglorious death. A demand on the part of Cleveland for higher education we have already seen to be a part of its conscious life, and if anything more is needed to illustrate the principle of progress, the material is close at hand. The demand for the best education seemed to be effective in 1851 when the "Cleveland University" was incorporated. A tract of land of seventy-five acres was purchased on the South Side where we now find "University," "Professor" and "Literary" streets. Dr. Asa Mahon, who was assisted in this enterprise by Ahaz Merchant and Brewster Pelham, was formerly president of Oberlin College and is the author of numerous works in Systematic Philosophy, as well as of "A Critical History of Philosophy," in two volumes, New York, 1883. The University was opened in 1852, and after graduating one class, was obliged to suspend through financial embarrassments, although it appears to have been scholastically a success. The effort of Cleveland to realize higher institutions is also seen in the perspective of the Franklin T. Backus Law School, the corner stone of which building is to be laid this day. In 1857 the "Ohio State and Union Law School" was removed from Poland to Cleveland and was later known as the "Crowell Law School" from its President, General John Crowell. The school ceased to exist after 1876. In 1882 the "Cleveland Law School" was incorporated, but it seems to have expired with no other result than to have emphasized the need, which, since 1892, has been so admirably met by the leading members of the Cleveland Bar. Enough has been said to indicate that intellectual interests have accompanied the growth of Cleveland, and also to indicate what the full and harmonious development of our life means and whereunto it must lead us. It was not until 1888 that the University idea, which has an interesting background in 1884, began to be so vigorously realized that one could say, "Now is the winter of our discontent made glorious summer." The history of the University and of Adelbert College from that time to the present is fresh in the minds of all. We remember with gratitude the late John L. Woods,—and other names to which, happily, the living still answer.

It is pleasant on this occasion to reflect upon the recent progress of our University. Within the last seven years, seven new buildings have been dedicated, and now there are three more assured,—the Law School, the Young Men's Christian Association, and the Biological Laboratory. This is a grateful pledge of the deep interest of many of our citizens in the advancement of learning. And why should not this interest exist and increase continually until we have one of the best equipped Universities in the land? Washington, Jefferson and Madison urged with all their influence the establishment of a National University. Alongside of this idea Jefferson urged the foundation of State Universities and it is notable that this was realized in Michigan even earlier than in Virginia. But the time has come when every great city must have its seat of learning. Have you ever thought of the forces that hold society together and make for its embetterment? Who are the leading representatives of the constructive, progressive, and conservative elements in our complex society? They are, or they ought to be, the clergyman, the lawyer, the physician, and the editor. These are the men who show the status and the temper of the times. Consider the educational influence which these men are continually exerting upon the community, and then think of the relations of the university to these professions and to these men. They are her children. These professions are the extensions of her teaching and power. Here is the College where the foundations are being laid and where the process of differentiation is begun. Here is the Law School, there the Medical College, and soon will come the Theological Seminary. We see here the bearing of the college and the university upon the life of this city and here are revealed the grounds why every citizen, as he is interested in himself and in his city, must also be interested in the welfare of our Schools, of our College and of our University. Here is the editor, perhaps the most influential of all public teachers. Will he strive to elevate public taste and keep us mentally clean and healthful, or will he pander to the lowest appetite and vitiate our life? Here is the physician who cares for our bodies and our minds diseased. But shall he not make the public health a part of his business and guard his city against plague and pestilence? Here is the lawyer who deals with positive law in code and precedent. But shall he not labor for the security of life and property in our city, so far as equitable laws faithfully administered can secure these great ends? Here in our cosmopolitan city the elements of social unity are weak. We have no common race, no common language, no common religion,—let us have common education and common law as the two mighty defenders of our commonwealth. Lawyers should interest themselves that we secure a government, not of lawyers, but of law. Here is the clergyman, who heralds the truth of God as revealed in the Bible and in human nature. Shall he not be faithful to his great mission and labor to keep all our great ideals bright and all our aspirations pure? Lord Beaconsfield declared, "There are but two living powers in Europe, the Church and the Revolution." In a broad sense this is true the world over. There are but two centers of our practical belief, righteousness and brute force. The time has come when all these professions which are ethical at heart, should work together for the highest ends. Colleges and Universities are multiplying in our country; already they number five hundred and ninety-four apart from professional and scientific schools. From our higher institutions about twenty thousands students are graduated annually. But quality is more significant than quantity. While college men are but seven per cent. of the voters of the country they hold fifty-five per cent. of the public offices. This proportion is still more striking when the learned professions are considered. The time is rapidly approaching when the College and the University will be the mother of all members of the learned professions,—the nursery and citadel of power. What these men and professions are to be depends largely upon the character of our educational institutions. It is an old truth, yet ever new, that "the letter killeth but the spirit giveth life." There is a literal education and there is a spiritual education. American University education is too severely of the letter. "'Tis life whereof its nerves are scant." Knowledge is indeed the foundation, but mere scholarship in a small part of a developed life. It may become isolated, cramped and captious under the present sway of specialization and competition. May our University realize and meet her obligations. May she send forth men and women of broad minds and sympathies, fully equipped in all that makes noble manhood and womanhood. May she teach and lead, representing the highest ideals of the race, and ever building upon the granite of the past. May she rise, not like the Paphian Queen cradled in the foam and fostered by the soft and enervating sentiments of life, but rather like Pallas Athene, cradled in the brain, wearing the helmet of just and noble warfare, the patroness of wisdom and of all the useful arts.

We have referred to the founding of libraries as an index to the intellectual development of our city, and again to the place of the college and the university in the constructive life of a municipality. These references would be incomplete on this occasion did we not remember the relations of the library to the life and work of the University. The Hatch Library has and will have a monumental significance. It will stand statuesque in its beauty, delighting the eye and satisfying our sense of unity and symmetry. It will ever remind us of the interest which an honored citizen feels in the welfare of his city and of his fellow man. It will mark the time when higher education in Cleveland struck a new chord in its swelling music. But more than all this it will stand for *two great fundamental facts* in our University work. The library is the link which binds the present to the past, and it is also the laboratory of laboratories in all higher educational work.

I know not how to bring the importance of the library in University life more vividly to our attention than by noting our dependence upon the past, of which the library is the great exponent. Time is the wise man. The past is our parent and teacher. Every individual, every society, every institution, has an historical perspective, so has every science, philosophy and language. There is a false philosophy in the familiar lines:

> "Trust no future, howe'er pleasant,
> Let the dead past bury its dead,
> Act, act in the living present,
> Heart within, and God o'erhead."

And also in these other lines:

> "Woulds't shape a noble life? Then cast
> No backward glance toward the past;
> And though somewhat be lost and gone,
> Yet do thou act as one new-born."

It is only by poetic license that we may wave the past into oblivion. Trust no future! bury the past! take no backward glance! act as one new-born! Surely this is infantile. Then we would have neither heart within nor God o'erhead. Forget Moses and Paul, Plato and Aristotle, Dante and Goethe, Shakespeare and Milton! The very thought makes us feel naked and forlorn. Then we should need no libraries and be stirred by no memories. The voices of the past can not be silenced, and our expectations of the future cannot be dissolved. Memory and imagination are to us the wings of the morning, and because of them we fight the battles of the day. "We are the ancients" only if we enter into our inheritance. We are abreast of the times only if we know the meaning of the times in the light of time. This is why the University life is and should be in large part a desert life, economically unproductive, a life of study and reflection upon the ideals and possessions of the race. The library is the dwelling place of the great men of the ages. It brings us within arm's length of the world's greatest teachers. It surrounds us with all the inherited wealth of wisdom and of knowledge. Here is Plato, who will bear us upon the wings of analogy and metaphor into the blue empyrean, where dwell the eternal verities and where we contemplate the ideas which from the beginning have swayed the sum of things. Here is Aristotle who brings us back to earth and to ourselves and bids us open our eyes to all the wonders of nature, of land and sea and sky, and to know there is nothing really great but mind the interpreter of nature and the discoverer of Deity. Here we find the literature of knowledge and the literature of power in all their forms, and, as the sight of the trophies of Miltiades in the streets of Athens would not suffer Thucydides to sleep, so the trophies of the mighty collected in the library have awakened many a youth from apathy or from mediocrity to put forth all his energies toward realizing the highest ends of life.

An ancient rule in Brown University reads: "Students shall come to the library at a time when sent for by the librarian, and they shall not enter the library beyond the librarian's table on penalty of three pence for every offence." But to-day the University library is a workshop, the laboratory of laboratories to both students and teachers. There are other laboratories, but they are dependent and secondary. The experimental sciences no less than the linguistic must be supported by the best literature and texts available. Every discipline demands three classes of literature,—its history, including reports of learned societes and current periodical literature; the systematic texts, descriptive and philosophical, by the best authorities and, finally, the dictionaries and encyclopaedias of the subject. These are in constant requisition. If you enter the building next autumn, you will find it a busy workshop, and if you enter it early in the term I hope you will find the librarian giving instructions to the new students in regard to what the library is and how it is to be used to the greatest profit and with the least waste of time. Here the student will do his most original and remunerative work; here he will come to sources first hand; and by his own investigations formulate opinions. I do not underrate the functions of the teacher, neither do I agree with Carlyle that "a University is merely a collection of books." But there comes a time in education when the student must be weaned, thrust upon his own resources, and set to work out problems for himself. He must be sent to the library with a task. He must trace out all the lines, summon all the witnesses, weigh all the evidences, and be able to defend his verdict. Suppose in studying the history of our country the student comes upon Seward's reference to the "Higher Law,"—

what does it mean? What political philosophy does it represent? With a word of direction the student begins his work and finds that it is a familiar note in our political literature. He pursues the thread to France and to the England of the seventeenth century, then to the political renaissance of the sixteenth century. Grotius and Hooker send him back to Roman Law and to Cicero, and Cicero in turn points to the Stoics and the Greek drama and to Heraclitus five hundred years before the Christian era, and thus he pushes on to the Orient, to Egypt and to China. He now retraces his steps, following the history of the idea from its first clear expression down to its latest exposition in our own day. He has made the round and has come home rich in his posessions. What a grasp of the idea, what a discipline of judgment, what a perspective of history, what a lesson in philosophy! He has mastered the theory historically and critically. This is education. This is the laboratory method *par excellence.* This is merely an illustration of the kind of work that is to be wrought out in this laboratory of laboratories.

To our friend and benefactor, Mr. Henry R. Hatch, we assure our warmest gratitude. He has relieved a pressing need in our scholastic life, and in so doing has extended our opportunities and laid upon us new obligations. As we think of the giver and the gift, these words from Tennyson are suggested:

> "*Her* office there to rear, to teach,
> Becoming as is meet and fit,
> A link among the days, to knit
> The generations each with each;
> And doubtless unto *thee* is given
> A life that bears immortal fruit
> In those great offices that suit
> The full grown energies of heaven."

MATTOON M. CURTIS.

A CENTURY OF RELIGIOUS LIFE.*

Primarily and chiefly this paper is supposed to concern itself with our city that is now laying emphasis upon its centennial. We are engaged in the endeavor to trace, along many lines, the growth of a hundred years.

In no respect may we regard our city as walled in and cut off from the rest of the world. As a part of a great Commonwealth, and a greater nation and a wider world we have lived and throve. The earliest settler on the banks of the Cuyahoga that "gleamed in the sunlight"—such freaks it is said to have had in days of yore—was not long allowed to think of himself as sundered from the East whence he came. New Connecticut was linked to the old Commonwealth of Hooker and Trumbull and Putnam; and the churches of New England kept watch over the early beginnings of civic life on the Western Reserve.

Our commerce, and our industries of every sort, upon which is built our material prosperity; at whose behest populations gather, and warehouses spring up, and homes are multiplied, and architecture invoked to shelter schools, churches, courts, municipal needs, in graceful and enduring forms—none of these things can rightly be considered, at all, apart from their connection with the coal fields of Pennsylvania and Ohio, the prairies and mineral lands of the north and west.

Nay, as all the lakes of the great chain, on one of whose links we throw our weight, flow into the sea, and the sea gives back through aerial channels what she receives, so are our industries and our commerce linked with all the lands the mighty ocean laves, in great and beneficent reciprocity. Our schools and colleges, of which we are justly proud, were impossible today, if all the foreign influence represented in them were at once to be eliminated. This is not to belittle the worth or the genius of them that pioneered the way, or built the later material and intellectual structures of our civic life. It is the recognition of a principle of universal application, viz., that no man liveth unto himself. All progress is the resultant of comparisons and inductions gathered up and crystallized into new and better composite forms. Nothing worth while is built up in isolation from what is kindred to itself elsewhere.

It follows that the same must be true of the religious life of the century in this city. While we must needs think of religion as setting up its shrine in the innermost sanctuary of the human soul, Faith and Reason sponsors for its vestal fires, yet is it fed from above, and nurtured from without; ministered unto by sacred architecture, and music, and ritual, the studies of scholars, the experience of saints, the deliverances of the schools of science and literature and theology, which make us better acquainted with the universe we live in, and so with Him in whom all true religious life begins and ends. Unless it is our purpose to minister to a mean conceit or an ignoble pride, we cannot cut the religious life of this city off from the rest of the world and the centuries that went before.

The religious thought and doings of New England; the theologians of many schools and many lands, yea many ages; yes, and the infidelity of this and other epochs, are all to be traced in the religious life of our city, this century through. The church of England and her great divines and universities, Wesley and Calvin, the Puritan theologians and Alexander Campbell, Voltaire and Paine, are all here, as well as every new-fangled notion imported from Asia or Europe.

It is in the presence of this vast inter-play of thought and action that we stand, cognizant of the unity in diversity in all this immense stir of human activity; in no sense less truly so in religion than in commerce and in trade. This makes our theme worthy of our serious attention, while it makes our task difficult and our step hesitant, it allures us on, as into a land, like Palestine itself, where all climes meet, rugged mountain and fruitful vale, bubbling fountains and thirsty plains.

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*Address delivered before the Alumni Association, in Beckwith Church, Tuesday evening, June 15th, 1896.

This being understood and conceded, let us begin and prosecute our endeavor, in which, at least, we can hope for only a partial success. The most obvious thing that meets us is, of course, the tangible evidences and outgrowths of these ten decades past. For convenience, we may divide our century into four periods; and turning to the first, what do we find? It were easier to say what we do not find. We find no church edifice, nor stated religious service, nor serious regard for Sabbath, or much reverence for religion, or the fear of God.

But *nothing* significant, as we now look at things, had got along. The tavern and the still, from which comes the saloon by lineal descent; the forlorn vestiges of Indian tribes made worse by the coming of the white man; the untroubled, unpolluted Cuyahoga flowing into the peaceful lake; the wooded bluffs through which the surveyor had set his prophetic stakes; the log court house, and the Public Square, innocent object of much contention—all these things were here. Infidelity was here, and away from the restraints of older settlements, for awhile ran riot in deviltry, in this wilderness. They must needs, in their small way, caricature even the Lord's Passion and death, since they could not get at Him to do Him violence.

Badger, on horseback, traversing the Reserve, and Bacon planting a town in religious faith, and Burton opening a school which grew into a college at Hudson, were typical of a better day, but, for this first quarter of a century, were like the wayfarer living by the day and questioning the morrow. God and the truth were not without occasional witness to the fact and the excellence of their being. But in this forlorn picture, everything good, and noble, and prophetic of great things, is involved. They were possibilities, nothing more.

An explorer, tarrying for a night, journalized the air of this now smoky town, as "infested with insects and loaded with miasm;" and the place as one "where no considerable population could ever be induced to settle."

Dr. Aiken, who came here in 1835, thus speaks of the first settlers: "Not a few of them had fled from New England, not only to improve their fortunes but to get rid of religious restraints, and especially, taxes imposed by government to support what was styled 'standing orders of the church.' The Sabbath enforced was a weariness to them. To free themselves from these and similar restraints many had migrated to the new and cheap lands of Ohio, where they could believe anything or nothing and live accordingly. Hence the majority of the first settlers either embraced infidelity or inclined towards it, or were indifferent to Christianity. Its friends were few and feeble, and against errors in belief and practice, bold and shameless, they had to contend against fearful odds."

This must suffice to indicate the conditions of the first quarter century. The religious life is of a piece with all the rest. But in the second, the hamlet becomes the village and then a city. At the very outset, new elements of population meet us from New England and New York. The feeble remnant of the godly is re-enforced, and the courage of the elect rises, and in the same proportion does evil beat a retreat, but the progress was slow.

Church organization, Episcopal, Presbyterian, Methodist, Baptist, Roman Catholic—five denominations, are here recognized at the end of the first fifteen years of this period, in a village of 5,080. Though the beginnings were feeble, they had come to stay, and repeat here, on the Western Reserve, what they had seen done elsewhere; yea, the story of gospel propagandism from earliest days of our christian era. Religion becomes a factor in the training of children, in the life of the home, in the ordering of civil affairs. The Lord's Day, from being devoted to sport and marketing, secures a reasonable recognition, and church services are no longer disturbed by the hunter's rifle. New Connecticut begins to emulate the old Commonwealth whose name was betimes imputed to her.

The Congregational order of things makes its first attempt to get a footing. Abnormal developments also appear, and Second Adventism and Perfectionism of a sort, were not only discussed, but had something of a following; and the anti-slavery agitation was, by this time, a cloud as big as a man's hand or bigger. These things engendered strife and wrecked the first Congregational church.

This brings us to 1845, and our city contained a population of about 30,000, and a half dozen church edifices, none of them notable. Dr. S. C. Aiken was then the conspicuous leader of religious thought—logical, level-headed, conservative and strong, the man for the place and the hour. He was well supported by Dr. S. B. Canfield of the Second Presbyterian Church, also clear-headed and strong.

In 1840 occurred the first notable revival, of a type current in that day and for some years later. The entrance into the kingdom was through violence. The day of child nurture into the kingdom had not yet got along. The results were both good and bad. Large additions were made to the churches, followed by serious reaction in the case of many.

The third quarter century—1845-1870—began in enlargement consequent upon increase of population, and the straightened quarters of the original churches. The one Presbyterian church grows into three, the Baptist into two, the Methodist into two, the Congregationalists establish what is now Plymouth Church, the Roman Catholic Church expands from the Cathedral centre outward, the Unitarians occupy a hall, the Jews have a Synagogue, and numerous Sunday Schools, prophetic of churches yet to be, are gathered in, then, suburban quarters. This period includes the great and pervading revival of 1857-8, the Civil War of 1861-5, with its enlistment of the lay element of the churches, in a degree before unknown, to meet the extraordinary demands for christian and philanthropic ministration, out of which has grown the, at once, blossoming and fruitful tree of Woman's Work, in Missions at home and abroad, in Temperance, in the many branched Christian Association.

No city was perhaps more notably affected by these movements, and few, if any, of its size, have more tangible results to show. The Christian Association movement for young men was then in its infancy, but a part of that new order of things which emphasizes the practical side of the christian life.

New leaders of religious thought appear upon the stage, Goodrich, Eells, Bittinger, Strong, Wolcott and Thome, Gilmore and Brooks—notable men intellectually and spiritually, building up the churches then extant, and preparing the way of the great expansion which followed upon the close of the civil war. Let it be borne in mind that, at the time of Dr. Aiken's retirement in 1860, our city numbered less than 45,000 people, and in 1870 but 92,825.

In 1864 it was your speaker's good fortune to be driven from Coit's to the Euclid road at Collamer, and thence into the city. From the Pittsburgh crossing, eastward, was a succession of farm houses, except where stood an insignificant village, known as East Cleveland. Wholly uninteresting and provincial was this village then. Metropolitan influences had apparently not touched it, or if so had been resisted. No sharper contrast exists within our city limits than that presented on a summer morning of 1864, between the village of that day, which had advanced somewhat upon Doan's Corners of the settler's era, and the present inspiring prospect of park, and college campus and architecture, business blocks and beautiful residences and churches. Euclid street was then being graded and a horse car occasionally traversed the distance from the crossing into the heart of the city.

The transformation of the last quarter century is little less than magical. The growth of the city outward; its elegant suburban quarters, its industries, commerce and population, multiplied as though an infant were suddenly to spring into a giant, has necessitated a kindred expansion of church facilities on every hand, in which the original half dozen have been, almost necessarily, conspicuous in leadership. Not less suggestive are the new and typical church edifices—Pilgrim, Epworth, Calvary, St. Paul's—contrasted with the old.

Adjacent hamlets, on every side, have been first connected by rapid transit with the city, and then, invaded from it, and transformed by its broader, more enterprising and cosmopolitan spirit. Thus, in brief, may be described the outward manifestation of the religious life of the century from 1795 onwards—a quarter of a century of very small things, however looked at; a quarter century of planting and nursing the early growth in a village of no great pretensions; a lengthening of the cords and a strengthening of the stakes for a third quarter of a century; and then the expansion which has called out the faith and the generosity of the churches, and made a field for its exercise. From no church edifice and a little handful of members, oppressed by their poverty, in 1820, to 80 churches in 1870, and 250 in 1895, an army many thousands strong, and able, financially, to do great things, is, indeed, a prodigious step forward.

Let it also be said that this expansion finds its parallel in a similar growth in the nation at large. The enterprise that brought a steamer into our harbor in 1822, took one to Chicago and Duluth later; and the entrance of a railroad in 1851, was the precursor of the day when San Francisco and the Pacific should be connected with New York and the Atlantic seaboard; which again is paralleled by christian enterprise, keeping pace with the population, till the whole vast expanse has been traversed and sown with churches and missions, schools and colleges.

For three-fourths of this century the churches were mostly huddled together in the down town district below Perry street. They came into close touch with each other, and were characterized by a genuine fraternity and freedom from rivalry which made union meetings both frequent and profitable; and for many years, special efforts were put forth in common, with marked results. These were the years when lay-evangelism reaped its largest fruits, and at last called into being the old tabernacle on Ontario street, in which Wm. H. Doan delighted, and whose evolution later was Music Hall, devoted to evangelism and christian temperance.

But with the expansion of the city from a radius of two miles to six, a change insensibly came over the spirit of the churches. There was not less fraternity perhaps but less opportunity for expression. The urgent necessity for occupying these new fields enlisted each church in the work of extension, and chapels sprung up in every quarter. The people, moving out, found it more difficult to reach the old centers, and new interests absorbed their time and strength. The early traditions of fellowship, however, remain, and though all the leading types of faith are here represented, Cleveland has never been disgraced by any considerable denominational quarrel.

The attitude of the churches towards questions of the day may be said to have been conservative with an openness to new ideas and an inclination to a healthy liberalism. They were somewhat slow to embrace the anti-slavery cause, but they got there with much vigor and great unanimity, at last. So of temperance, and the many phases in which the influence of women has presented itself, going from one degree of ascendancy to another, in the sanitary commission in war time, in missions at home and abroad, in local and manifold charities, in the latter days of peace.

In any considerable community will be found a combustible and uncertain element. It was seen here in the days of Second Adventism, but this burned itself out early and was no more seen. The possible heat of a conservative community was felt in the Temperance Crusade, which enlisted in a phenomenal degree the women of all classes, and was the more intense, since the most conservative of them all were found, hand in hand with the most radical, in burning indignation against a bitter and crying evil whose waves, were, most of all, the desolation of womanhood, and in prayers to heaven for redress—or better yet, the conversion of their foes. For this movement was essentially religious and to the actors, specially inspired of God.

How little ultra-conservatism there was is seen in a typical case, the attempt to establish an old school Presbyterian church which was never a success and soon ran its course. Sympathy with moderate and progressive liberalism finds a typical case when the synod of Western Reserve, inclusive of Cleveland, is cut off, with three others, as "defective in doctrine," by the Old School Assembly; and in the attitude of the Presbytery of Cleveland today towards current issues, not only in the Presbyterian church, but in the religious thought of our time. We have only to recall representative men, past and present, in the pulpits of other denominations—notably the Baptist, Methodist and Episcopal—to see that, what is true of the Presbyterians is largely characteristic of the religious attitude of our city.

There is no better place than this to glance at the deeper currents and movements of thought and life during this century, out of which the newer, more fruitful and exuberant life of today has sprung. And nowhere is it more apparent that to know ourselves and our history we must go far afield. Nothing is so cosmopolitan as thought and truth, nothing more self-assertive once they have birth in earnest souls. The religious thought of the first fifty years of the century in review was dominated by high Calvinism, and by antagonism to science. It has been thoroughly revolutionized. And in this reconstruction, we recognize the work of master spirits in England, Scotland and Germany, and the divines of our own country—yes, and the shock of the Unitarian schism.

Great and loved names shine out of the past —Maurice, Kingsley and Stanley, Bushnell, Beecher, Barnes, Smith, Channing, Peabody, Parks—they live in the life of today, in the teaching of college and seminary, in the theologies of the pulpit, in the aggressive life of the churches, in the new and sweeter because truer interpretation of the word of God. The youth of today can scarcely surmise how great the transition has been.

Dr. Gordon but tells the simple truth when he says: "Under the supremacy of the Augustinian and Calvinistic conception of human nature, the consciousness of sin necessarily tends to become exclusive, and the task of Christian living to become more and more a lamentation over the defect of character and a despair of goodness. More and more, salvation must become, not the act by which God educates His children and claims His own, but the triumph of Almighty pity over sheer worthlessness. This over-done sense of depravity, hardened into dogma, stood for centuries against the truth that the morality of God in Christ is the morality for mankind."

In the last half century man has found and seen the Father, and finding Him has come to himself as God's child, though a prodigal; bearing the image of God, shattered but not effaced. These great facts, clearly seen, are and must be revolutionary of high Calvinism. In their light we study the religious history of mankind and look out on the world of today with new eyes; we read the Book of books by the light of their torch, and the message of the Father is no longer partial and self-contradictory, but broad as the race, old as time, new as the moment that now is and then is not, and honest as God is true.

From these new conceptions of the truth, the multiplied activities of the latter day church cannot be sundered. They inflame the missionary spirit, they make the whole world kin, they summon men to live their faith and make themselves the keepers of their brother. We study our Bibles in a historic spirit since it is seen to be a library produced in time and has a history. We find it a literature as well as a text-book of ethics, a most human book resplendant with a revelation from God. In its pages, as in the Christ and in the church, the divine and human meet and recognize each other. But as in Him, so in the Book, the line betwixt the human and the divine cannot be drawn. We study nature, no longer to antagonize science and prolong a senseless quarrel, but realizing ourselves as workers together upon the great fabric of the Divine revelation of Himself in which there can be no cross-purposes or contradictions. Within the lifetime of many of us science has, indeed, revolutionized theology, but it has also re-enforced religion; and nothing is more significant than the changed attitude of scientific men themselves. See this when John Fiske affirms: "Of all the implications of the doctrine of evolution with regard to man, I believe the very strongest and deepest to be that which asserts the everlasting reality of religion;" and by religion he means, "the belief in a personal Deity, in an unseen world in which human beings exist, and the recognition of the ethical aspects of human life as related in a special and intimate sense to this unseen world." Significantly he adds: "We have at length reached a point where it is becoming daily more and more apparent that, with the deeper study of nature, the old strife between faith and knowledge is drawing to a close."

This is, therefore, quite another world, and the religious life of today quite another and broader affair, than that of the pioneer of the Western Reserve.

We may be inclined to think some of these changes for the worse rather than the better. We may think that since the Bible of today is, chapter and verse, the Bible of our fathers, religious thought and belief ought to be stationary. But then, they are not. The men of fifty years ago had no more gotten out of the Bible all there was in it, than they had exhausted the domain of nature.

In the last quarter century, especially, the Bible has been put in the focal light of archaeology and Biblical geography. It is read with a better understanding of the men and the times, the real purpose of prophet and apostle, whose thought we are trying to get at.

We are seeing that Revelation is progressively given, and are holding the Old Testament to its appointed task, and judging it by that, rather than imposing upon it the loftier standard of the New.

We are seeing, more clearly than ever before, that God has not left himself without a witness among other peoples and in other faiths, till in the fulness of times He sent forth His son. This has not accrued to the disparagement of the christian faith, nor made the Bible less a book for the people; but God is apprehended as more lovable, more father-like, more immediately nigh at hand, more certainly the God and father of all men, and who will have all men to be saved and to come to the knowledge of the truth.

Sin is seen to be not less terrible, righteousness not less resplendent, penalty not less sure to follow upon sin but less arbitrary, redemption not less a necessity for man when viewed in the light of the new science of heredity and environment. The gospel was never more needed than when the appeal of the material world is so incessant and urgent, and the reign of law is emphasized.

The transition of which we are all conscious is one, I think, "not so much of *views* as of *view*," and must be judged by its fruit. It has made men not less serious but more earnest, devout and righteous. No change of belief, is matter of congratulation, if it does not lead out to something nobler and grander, and make better men. One has well said, that progress in religion "must seek not merely for new notions and ideas, but for a larger and deeper sight of God, and must test itself, and let itself be freely tested, by the eternal and universal standards of devoutness and morality." Of the transition there can be no doubt. Will it bear this test?

It is surely significant that this transitional period of belief is, of all others, the one attended by the greatest progress of the kingdom through world-wide effort. The nobler and the more real, in our view, the character of God, the more genuine, humble and reverent our self-respect, the better life and work.

Nor is the reason of this far to seek It lies in the awakened sense of individual responsibility, and world-wide relations with brother men, clearly seen in the light of the new Theology and of the ends of the world brought together. Contrast the attitude of the church at the beginning of the century and now. Hear them saying, "if God wants the heathen converted He'll look to that. Young man, sit down!" Hear one and another saying of himself, "If God wants me converted, let him convert me. I can only sin if I attempt to mend my ways!" Fatalism thus invaded "orthodoxy" and bound the free spirit in fetters of iron, and tied fast the hands that might have wrought for Him, the feet that might have run for Him.

At length the great enfranchisement came, but gradually, as the day breaks and calls the world to awake, and work, and sing. We have seen spring into being an immense, and varied, and intelligent lay-effort, heartily seconded by the pulpit. Lay evangelism for a time thrust to the fore, gradually giving way to the constant and potent influence of the family and the teacher, bringing children and youth to begin their active life in the church. Associations of young men and women, animated by a spirit of helpfulness to each other, and concern for those that are without. Christian Endeavor Societies and Epworth Leagues, within the churches, organized for service among children and youth, and schooling themselves for all the activities of riper years.

All these things are superseding the work of the professional evangelist, discounting largely, the old revivalistic methods, and yet, with no diminution of accession to the churches, and with a healthier because more normal life and growth. The abiding spirit of truth and newness of life, with power, is making the church, like the tree by the river of God, perennially to bear fruit.

All this has been attended by a no less marked change of method in church activities. Are we able to call up the church of fifty or seventy-five years ago? Then we know what a church is like where the minister and the official board—every mother's son of them a man—did all the work. When a woman was not suffered to speak, and a child proposed for admission to the church was an object of suspicion, and the traditional experience was made the measuring rod of all candidates. When emphasis was laid mostly upon preaching and feeding thereupon, and the age of "activities" had scarcely begun to dawn. I speak of this type of church and of the by-gone time, only with reverence. They lived according to their lights, and they had the reward of them who truly live. But I must believe that we see a better day and a more Christ-like church, though by no means faultless.

Call up this modern church, as the life thereof finds expression. We may not shut our eyes to a deal of trumpery incongruity when the people try to be social, or to replenish their exchequer by fairs and grab-bags, or the minister seeks to draw to his public service by absurdities of irreverence in press-announcement. We are sometimes ashamed of the modern church and her doings, but after all, these are blemishes upon an otherwise vigorous life. Here is something for everybody to do. Organization seeks to embrace men and women, children and youth, each with a purpose bearing on the coming of the Kingdom, and concerned with the near and the far, with the body and the soul, with the things that kill and the things that make alive. Wheels within wheels; women a voice and a pull at the oars; childhood a voice and a song and a gift for Jesus. Women and children crowding the slower man to ask himself and find what he is in the church for, and furnish a pocket-book for all the rest to draw upon; and when it comes to the many-headed thing called Institutional, there seems to be nothing in heaven or on earth that the church is not to do and teach. It becomes a kindergarden and a winter college and a summer play-ground, a hospital and a reformatory, an employment bureau and wayfarer's lodge. Nothing is accounted foreign to it that concerns the biped man. It is made for the time that now is, but it considers itself bound for eternity.

Rightly seen there is reason in all these movements. They are allies not substitutes for grace and the work of the divine spirit. They have their spring in the exuberance of life, and the sense of responsibility, which the new conception of God and Man, time and the world, has begotten and modern discovery and invention made possible.

Another notable expression of the religious life of the last thirty years is seen in the charitable and humane institutions, which have sprung up among us and subsist upon the bounty of the many and the superfluous wealth of the few. The list is too extensive to be cited in detail, its scope too varied to be sketched in a paragraph. It is enough to note how in number--forty more or less—they compass the whole range of human life, from the infant in the creche and the child in the kindergarden to old age and hopeless invalidism. There is thought for them who are making their way in the world and for them who are temporarily laid aside; for the orphan and the worse than orphaned through crime or neglect; for them who have strayed from virtue's path, and for them who walk on the crumbling verge of a pure and self-contained life. The hand is outstretched to the needy, and the next of kin in the animal world are not forgotten.

This benevolent activity expresses itself through many organizations, the willing service of hundreds of lives, the expenditure of not less than a hundred thousand dollars annually, and in numerous costly and enduring structures. As typical of them all and the best of their kind may be named the new Lake Side Hospital, the Y. M. C. A. building, the Infant's Rest on Cedar avenue, the Lend-a-hand Mission, and Goodrich House in construction for the Old Stone Church. They are scattered all over our city, east and west, monuments of individual or associate thoughtfulness of man for his fellow--the recognition of the bond that unites us all in one great brotherhood.

Not less can be said for the alliance of the religious life of the century with education. We have this as our inheritance straight from New England. The life of our city from the first and continuously has upon it the impress of New England and New York, rather than Pennsylvania and New Jersey—progressive rather than conservative in type. It was like the descendants of them who planted Harvard and Yale, early in Colonial times, to think of a college on the Reserve almost as soon as the surveyor had done his work. And, as with the older, so with the newer, the immediate incentive in that day, was to provide for an intelligent and educated ministry. The appeal was, therefore, to the churches, and was answered in self-denial with such things as they had and out of their poverty. In this spirit Western Reserve College had its birth, and Oberlin nine years after, though, at length, and by degrees, of a more distinctively denominational type. The self-denial of the people was, for more than half a century, matched by the devotion and self-sacrifice of the professors. Kenyon, and Delaware, and Denison, and Hiram, and Calvin Colleges, here and hereabouts, have drawn their support, in no small degree, from the denominations they represent, as found here; while the whole Cleveland system of schools expresses the cosmopolitan spirit of all classes of people and shades of belief in regard to the necessity of an intelligent and moral body of citizens. We may not say of this system, it is the outgrowth of the religious spirit, but it is quite within bounds to say that it could never have been without it.

Of the higher walks of learning we may claim that they have been distinctively religious in beginning and continuance, in motive and in aim. It was quite in keeping with the close affiliation of the Congregational and New School Presbyterian churches, in a new country, with everything in common but their polity of church government, alike poor in this world's goods yet rich in faith, that they should work together in building up churches and the one college, that, for a little, stood for their common faith. This, for a time, they did. But, at length, the claims of denominationalism were pushed to the sundering of this co-operation in church extension, and by logical sequence, in the work of higher education. Oberlin, from that day to this, has absorbed the affection and the interest of the Congregationalists of our city, and of some Presbyterians.

The Western Reserve College, which began as a new Yale, has, from the presidency of Hitchcock, on to its removal, and since its change of name, first broadened the charter of its life to stand, not for sect but for christianity, in education—to come at the study of God, man, and the world, from a christian rather than a sectarian standpoint, and in a christian spirit—then broadened itself still further, in keeping with the demand of the times, into a University with ample provision for the education of women, but throughout these last thirty years or more has drawn its sinews of war mainly from Presbyterians.

How much the religious life of the century has been influenced by all this significant regard for the higher education here and elsewhere, of course, no man can definitely measure.

But this much can surely be said. It has elevated the standard of life; it has made necessary a high order of talent in the pulpit and the professor's chair; it has fitted a great multitude for a better appreciation of literature, and art, and the ends of life; it has liberalized the professions and brought them closer together; it has helped to break down the senseless antagonism between religion and science, making religion more scientific in spirit and science more religious, and combined their forces against their common foes—ignorance and bigotry.

Religion no longer quakes in her shoes over every new discovery of science, and science no longer turns her batteries against religion, but from the high seat of her masterful ones comes the confession of a personal God, of immortality and moral sanctions. It may still further be affirmed that in this union of religion and learning, for three score years and ten, it has come to pass that something of resistance has been made to the materialistic spirit of our age, and something contributed to a sense of responsibility in the use of wealth. For the things that first of all impress the beholder, are not our commercial structures, but our churches and school buildings, our colleges grouped in imposing front, our hospitals, asylums and humanitarian institutions—the greater part of which, and all but the public school buildings, represent the free will offerings of rich and poor, the expression of their estimate of the value of the higher things of life, the things that make the whole world kin.

I am not slow to affirm that these great humanitarian and educational plants, as well, though not as directly as the church edifices of which we speak, sprung into being out of the religious sentiment of the people, out of a more or less positive recognition of the Fatherhood of God and the brotherhood of man, on which christianity structurally rests. They are found under no other auspices. Religion is alone powerful enough to lay its restraint upon the conscience and say to this materialistic age, the life is more than meat. What shall it profit a man to have gained the whole world and lost his life? He that will save his life shall lose it. Religion, as Christ incarnates it, answers the selfish and heartless query of Cain, Am I my brother's keeper? in the same affirmative with science and history—Keep thy brother or go down into the pit together.

The most significant expression of the religious life of this century, after all, is found, comprehensively, in its missionary spirit—that broad, catholic movement which recognizes the kinship of all sorts and conditions of men, on all the face of the earth, the near and the the far, in space or race, which, in this latter day, elbow each other on this planet, and tomorrow will come into yet closer contact, and the next day will be struggling for mastery. What a day will that be—yea, what an Armageddon of horror, if it be simply a struggle of brute force. What a piece of wise forethought, what a demonstration, that to seek first the kingdom of God is profitable unto all things, was the Master of Master's sublime commission, Preach my Gospel, the Gospel of the Divine Fatherhood and of the brotherhood of all men, *to every creature.* Thus only can we hope to prepare the way of that mingling of races on all continents which is so imminent, which we may almost say is here already, but not in power, not in the fulness and resistlessness of the avalanche.

Contemporaneously with the first footsteps of the settler on the banks of the Cuyahoga, was English speaking Christendom awaking out of her long sleep to study the map of the world that Discovery was revealing; and the conscience quickened by the new Gospel, which yet was as old as Christ, was groping into the day, to read her duty with new eyes.

The century we celebrate is also a century of missions. Distinctively foreign, at first, but in its blessed reactions and new births of the spirit, fructifying the home field, planting the mission and the church on the movable and receding frontier, exploring the slums of the cities and the by-ways of the country, mediating between conflicting classes and carrying the church, at length, into all phases of civic life, and preaching the applications of the gospel of righteousness as binding *upon* all, and once heeded, sufficient *for* all.

With this hasty and inadequate survey, our task ends. We may summarize our first century; we cannot leave it behind. The new century begins where the old left off, and on the foundations laid must build; the forces now at work must be utilized, however transformed and enlarged they may become. The future without the past cannot be perfected.

Pioneering is a thing of the past. The day of small things is over. The slow-paced gives place to the fleet, the commonplace to the marvelous, but the day will never come when any generation can live unto itself; when the cardinal virtues of the christian faith can be dispensed with; when the problems of human life will not call for the best that the noblest manhood can devise; when education and religion can be safely divorced, either from each other or from the public weal.

We hail the new century with a vision of the new order of things that is to be—when there shall be more sanity in human life, less selfishness in civic spirit, more breadth and power in religion, in education more culture of the best and noblest in man and woman, in civilization less poverty and pain, less greed and strife, less materialism and idolatry of wealth, more of the spiritual, the humane and the brotherly. May they who live to celebrate our city's second centennial have already entered upon the fruition of these high hopes and optimistic ideals.

SOME COUNTING IN SHAKESPEARE AND IN THE GREEK NEW TESTAMENT.

I. SHAKESPEARE.

Some of my classes in Shakespeare have counted the speeches and lines spoken by each character in the plays, scene by scene, giving also the total number for each play. Below are selections from this work, with a few points suggested by them. Allowance must, of course, be made for doubtful reckoning on account of broken lines. The total lines of the plays are taken from the Introduction to the Leopold Shakespeare, p. cxxiii. The plays selected—about half the entire number—are in alphabetical order. But few of the characters are mentioned, but all of those who speak the most lines.

ALL'S WELL THAT ENDS WELL.

Total lines	2981
Helena	477
King of France	383
Parolles	377
Countess	284
La Feu	275
Bertram	268
Clown	210

P. J. T. '95.

AS YOU LIKE IT.

Total lines	2904
Rosalind	660
Orlando	296
Celia	273
Touchstone	266
Jacques	230

C. A. K. '95.

CYMBELINE.

Total lines	3448
Imogen	526
Postumus	408
Iachimo	404
Belarius	297
Cloten	246
Cymbeline	240

E. W. K. '95.

HAMLET.

Total lines	3924
Hamlet	1439
King	513
Polonius	341
Horatio	252
Ophelia	119

S. D. S. '94.

I. HENRY IV.

Total lines	3070
Falstaff	685
Prince Henry	612
Hotspur	549
King Henry	339

E. R M. '96.

HENRY V.

Total lines	3320
Henry	1037
Fluellen	282
Katherine	62
Queen Isabel	24

E. E. J. '94.

KING JOHN.

Total lines	2553
Falconbridge (Bastard)	511
King John	422
Constance	260
Hubert	125
Arthur	113

C. H. S. '95.

KING LEAR.

Total lines	3542
Lear	766
Edgar	401
Kent	376
Gloster	345
Edmund	319
Fool	248
Goneril	201
Regan	188
Cordelia	115

Table I, Shakesperiana, April, 1885.

MACBETH.

Total lines	1993
Macbeth	700
Lady Macbeth	238
Malcolm	207
McDuff	174

G. W. B. '94.

MEASURE FOR MEASURE.

Total lines	2809
Duke	839
Isabella	379
Lucio	301
Angelo	209
Claudio	111

J. K. W.

MERCHANT OF VENICE.

Total lines	2705
Portia	566
Shylock	359
Bassanio	328
Antonio	183
Lorenzo	176
Gratiano	171
Launcelot	168
Nerissa	84
Jessica	82

M.

OTHELLO.

Total lines	3324
Iago	1108
Othello	893
Desdemona	396
Cassio	279
Æmilia	257
Brabantio	145
Roderigo	118
Clown	30

RICHARD III.

Total lines	3599
Richard	1109
Buckingham	381
Elizabeth	266
Margaret	215
Clarence	170
Lady Anne	159
Richmond	136
Duchess of York	134

M. H. L.

ROMEO AND JULIET.

Total lines	3002
Romeo	585
Juliet	545
Friar Lawrence	344
Nurse	279
Mercutio	264
Capulet	253

L. J. U.

TEMPEST.

Total lines	2068
Prospero	581
Ariel	173
Caliban	158
Stephano	153
Gonzalo	144
Antonio	131
Ferdinand	119
Miranda	106
Boatswain	43

G. P. K. '95.

TWELFTH NIGHT.

Total lines	2684
Sir Toby	337
Viola	316
Olivia	304
Clown	303
Malvolio	266
Duke	204
Sir Andrew	156
Maria	142

C H. R.

WINTER'S TALE.

Total lines	2758
Leontes	594
Autolycus	315
Paulina	290
Camillo	269
Polyxenes	244
Hermione	190
Florizel	188
Clown	208
Old Shepherd	139
Perdita	107

H. W. '96.

Remarks.

1. One notices a great difference in the plays in respect to the balancing of the characters. In All's Well, Cymbeline, and Romeo and Juliet the two or three leading characters are nearly evenly balanced in quantity. While in Hamlet, Henry V, Othello, and Richard III the reverse is true. In these four plays the largest number of lines exceeds 1,000.

2. In general, the number of lines indicates the importance of the character, but we must sometimes estimate this importance by the progress of the action, and sometimes by the aim of the play and the sentiments expressed. Hamlet speaks over 1400 lines, almost one third of the whole play. This gives emphasis to the common allusion to "the play of Hamlet with Hamlet left out," but it is not the action that requires the disproportion, but the thought.

3. The dominance of some strong character is often indicated by the lines spoken, as in Richard III, Othello, and King John.

4. Now and then, when Shakespeare makes additions to the story which he dramatizes, we seem to detect a partiality for his own creations, that does not coincide with their importance, as Touchstone in As You Like It, Sir Toby and the Clown and Malvolio in Twelfth Night, Autolycus and Paulina in Winter's Tale.

5. More certainly do the lines measure the poet's own interest in the characters, historical or imaginary, as Henry V, the Fool in Lear, and the Nurse, even, in Romeo and Juliet.

6. Especially do we see his fondness for his humorous characters, whether created by himself or not. He did not scorn to raise a laugh, and a great many of them. Witness the first place given to Falstaff in I Henry IV, and the fourth place to the King. See also Parolles in All's Well, and Fluellen in Henry V.

7. The tendency to give to the male characters more than to the female was natural, but in All's Well, As you Like it, Cymbeline, and Merchant of Venice, the latter have the most lines. This would be expected of Portia and Rosalind, but hardly of Helena and Imogen.

8. It hardly needs saying that the best men do not always do the most speaking. Iago heads the list in Othello, outstripping the hero by 200 lines and Desdemona by 700. Iachimo equals Postumus in Cymbeline, and comes within 120 lines of Imogen.

9. By no means do the counted lines measure the interest of modern readers. Who cares as much for Leontes in Winter's Tale, who detains us with 600 lines, as for Perdita, of whom Dowden could write, "Perdita belongs to the group of exquisite youthful figures set over against those of their graver and sadder elders in the plays of this period. * * * There is nothing lovelier or more innocently joyous in poetry than Perdita at the rustic merry-making, sharing her flowers with old and young." Arthur in King John is worth more than one-twentieth of the quantity of speech. Miranda in the Tempest is a great deal more than 100 lines; and many would miss from the same play the 43 lines of the Boatswain more than five times that amount subtracted here and there from more showy characters. Then too, every one knows that the women of Shakespeare stand on a higher plane, in general, than his men, oftener morally, but sometimes intellectually, and yet this position is seldom assured to them by giving them the most to say.

II. GREEK NEW TESTAMENT.

It has been noticed that the Gospel of Mark contains many examples of the historical present. My class in New Testament Greek was asked to turn this general impression into exact statement by counting the examples, and comparing the usage of the four Evangelists. The following definition of the historical present is given in Professor Burton's "New Testament Moods and Tenses:" "The Present Indicative is used to describe vividly a past event in the presence of which the speaker conceives himself to be." (§ 14). But as the vividness admits of degrees, and sometimes lowers itself to a mere habit of style, we may say that every present that is used in narration where a past tense would be more exact, is a historical present. With this broad understanding of the term, the count resulted as follows:

Matthew 93, Mark 143, Luke 16, John 160. This should be modified, of course, by the fact that Mark is the shortest Gospel. If Mark be called 1, then John would be about 1¼, Matthew 1½, and Luke 1¾. Using this proportion we correct the figures thus: Matthew 62, Mark 143, Luke 9, John 128. This represents the relative usage, and proves that, while there is a great difference between Mark and Matthew, and while Luke is almost out of consideration, there is practically no difference, in mere numbers, between Mark and John.

In regard to the verbs that are used in the historical present, we should expect, in such narratives as the Gospels, a large use of "he says" and "he comes." Matthew uses λέγω 65 times, ἔρχομαι 5 times, and 15 other verbs together 23 times. Mark uses λέγω 68 times, ἔρχομαι 25 times, and 22 other verbs 50 times. Luke uses λέγω 9 times. John uses λέγω 117 times—λέγει 19 times in one chapter, the 21st—ἔρχομαι 15 times, and 17 other verbs 28 times. The large number of different verbs indicates a fixed habit on the part of three of the Evangelists.

This usage forms a very simple, but trustworthy test of style and authorship. The test of vocabulary is less certain, because the acquisition of new words is more a matter of conscious purpose, and self-training, and is more dependent on circumstances, reading, and associates. A grammatical habit, though less obtrusive, is more fundamental, and a better sign of identity because it is almost beneath consciousness. To affirm or deny authorship from vocabulary merely, is like judging handwriting by carefully formed capitals, instead of the slope and angles and unintentional, almost unavoidable, peculiarities of the common letters.

A fine illustration of the historical present as a feature of style is furnished by Xenophon's Anabasis. Not only the ἐντεῦθεν ἐξελαύνει, of pleasant recollections, instead of ’ήλασε (I. 2. 23), but the very first verb in the book is an historical present — Δαρείου καὶ Παρυσάτιδος γίγνονται παῖδες δύο—the latter with very little occasion for employing it. This lack of occasion indicates at the outset a *habit* of style. In the first three sections of chapter I, containing but little over 100 words (113), there are seven instances of the historical present, and 31 in the first two chapters. Thucydides has *one* (I. xxvi. 3) in the first 36 chapters of Book I; but a fair comparison would make account of subject-matter.

To return to the Greek Testament, the infrequency of this present in the Gospel of Luke raises the question whether it is found much in the Acts. If it were, one mark of Luke's authorship would be lacking. I have not been able to discover a single example, although many opportunities occur not only in general, but in the various riots described, and in the famous shipwreck. In regard to the differences between the first three Evangelists, they suggest that neither copied from the other; but each employed his own style on much common material, derived largely from Aramaic sources, either oral or written.

L. S. Potwin.

A SELECT BIBLIOGRAPHY FOR THE STUDY OF LOCKE.

I. LOCKE'S WRITINGS AND EDITIONS OF HIS WORKS.

John Locke (1632-1704), known to us chiefly as a philosopher, was in his own time, equally prominent as a theologian, statesman, and financier. Without doubt he was the most typical and influential thinker of the seventeenth and eighteenth centuries;—in general philosophy, in theology and in politics. To preserve the continuity in Locke's development I have placed his writings in chronological order and have introduced a number of early essays and fragments which are only found in biographies of Locke by Lord King and by Fox Bourne. A complete edition of Locke's works is a *desideratum*.

1. On Philosophy. Written before 1660. As in the "Essay" the Stoic division of philosophy is adopted —Physic, Ethic and Dialectic.
2. Reflections upon the Roman Commonwealth. Forty closely written pages of manuscript written cir. 1660. "Shows a profound study of Roman history and politics," and is in essential harmony with his later political philosophy.
3. Whether the Civil Magistrate may lawfully impose and determine the use of indifferent Things in Religious Worship. Written immediately after the Restoration, 1660. Locke gives an affirmative reply.
4. Infallibilis Scripturae Interpres non Necessarius. A vigorous criticism of Roman and Protestant claims to infallibility. 1661. See also article on "Error," Lord King, pp. 282-285.
5. Virtue and Vice. 1661. Moral law is regarded as the will of God discovered by natural reason.
6. Sacerdos. A lengthy essay against sacerdotalism and dogmatism, written about 1661.
7. Essay Concerning Toleration. An unfinished essay showing Locke's views at this time, 1666. Given by Fox Bourne I : 172-194.
8. De Arte Medica. Dated 1669. Given by Fox Bourne I : 221-228. Shows lines of thought that culminated in the "Essay."
9. Discourses translated from Nicole's Essais de Morale, 1673, and presented to the Countess of Shaftesbury. Locke's translation of the three essays was edited by Thomas Hancock in 1828.
10. On the Difference between Civil and Ecclesiastical Power, Indorsed Excommunication. Dated 1673-1674. See Lord King's Life of Locke, pp. 300-306. Argues an entire separation of Church and State.
11. The Fundamental Constitution of Carolina. London, 1720. This was written about 1673 when Locke was Secretary for Lord Shaftesbury, but was never adopted by the American Colony. It gives a clear expression to many of Locke's political views. See Bancroft's history.
12. A Letter giving an Account of the Debates in the House of Lords in April and May, 1675. London, 1720.
13. Obligations of Penal Laws. Written in February, 1676. Lord King, pp. 61-63. Valuable on sanctions of conduct. (a) See also important fragment, Of Ethics in General, *ibid*, pp. 308-313.
14. Methode Nouvelle de dresser des Recueils. Published in Bibliothèque Universelle, Vol. II. 1685. English translation, London, 1697, and since in about 28 editions.
15. Review of Boyle's "De Specificorum Remediorum cum Corpusculari Philosophia Concordia." In Bibliothèque Universelle, 1686.
16. An Epitome of the Essay Concerning the Human Understanding. Prepared at the request of Le Clerc in 1687 and published in the Bibliothèque Universelle in January, 1688. An abstract from Locke's own hand is given in Lord King's Life of Locke, Bohn ed. pp. 365-400.
17. Rules of a Society which meets once a week for their Improvement in useful Knowledge, and for the Promotion of Truth and Christian Charity. London, 1720. Written in 1688. See also Lord King's Life of Locke, pp. 276-278, for another set of rules for a society of "Pacific Christians."
18. Epistola de Tolerantia ad clarissimum virum, &c. Written to Limborch at Amsterdam,—English translation by Wm. Popple under the title, A Letter Concerning Toleration. London, 1689.

a. A Second Letter for Toleration. Occasioned by an attack by Jonas Proast. London, 1690.

b. A Third Letter for Toleration. London, 1692.

c. A Fourth Letter for Toleration, 1706. A few pages written in 1704 ending in an unfinished sentence. Thus Locke's last effort like his first was a plea for Toleration.

d. Locke's Letters Concerning Toleration, with a portrait by Cipriani, was published at London in 1765.

19. Two Treatises of Government: In the former the false principles and foundation of Sir Robert Filmer and his followers are detected and overthrown. The Latter is an Essay Concerning the True Original, Extent, and End of Civil Government. London, 1690. Licensed for printing August 23, 1689. This edition and those of 1694 and 1698 were published anonymously. French edition, Amsterdam and Geneva, 1722. Best edition by John Hollis, London, 1769. Cheap Edition, including Filmer's *Patriarcha*, to which Locke's first treatise is a reply, with introduction by Henry Morley. London and New York, 1887.
20. An Essay Concerning Human Understanding, in Four books. London, March 1690. Second edition, called for in August 1692, but published in October, 1694, with many additions. A third edition with few alterations, June, 1695. The fourth edition, carefully revised, with two new chapters, on the

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NOTE.—Professor Curtis was unable to revise the last proof of this article, any mistakes may thus be accounted for.

Association of Ideas and On Enthusiasm, was published in the late autumn of 1699, dated 1700. Fifth edition (sixth edition according to "Epistle to the Reader"), with some corrections by Locke, was published posthumously in 1706. More than forty English editions of his "Essay" have been published.

a. A French translation was made under the supervision of Locke by Pierre Coste, with the title, Essay philosophique concernant l'entendement humaine ou l'on montre quelle est l'entendre de nos connoissances certaines, et la manière, dont' nous y parvenons, traduit de l'anglais par M. Coste sur la quatrième edition, revue, corrigée et augmentée par l'auteur. Amsterdam, 1700.

b. A Latin translation by Richard Burridge was begun in 1696 and appeared under the title, De Intellectu Humano, London, 1701; reprinted at Leipsic, 1709, at Amsterdam in 1729, and again at Leipsic, with introductions and notes by G. H. Thiele, in 1731.

c. German translations by H. E. Poley, Altenberg, 1717; also by W. G. Tenneman, Versuch über der menschlichen Verstand, *mit einem Abhandlung über der Empirismis in der Philosophie*, in the third volume. 3 Bde Jena und Leipsic, 1795-1797; also J. H. Von Kirchmann, Versuch über der menschlichen Verstand. in Vier Büchern. Uebersetz und erläutert. 2 Bde. Berlin, 1872, 1873.

d. The best edition of the Essay is by Alexander Campbell Fraser, in two volumes, Oxford, 1894. This invaluable edition is collated and annotated; with Prologomena,—Biographical, Critical and Historical.

e. An Abridgment of Locke's Essay was published at Oxford, April 17, 1695, by John Wynne, and widely introduced in British and American educational institutions. Translated into French by Bosset 1751; into Italian by F. Soave, Milan, 1815. The third book of the "Essay" is edited with introduction and notes by F. Ryland. London, 1882.

21. Some Considerations on the Consequence of Lowering the Rate of Interest and Raising the Value of Money, in a letter to a member of Parliament. London, 1691. Second edition, 1692.

22. Some Thoughts Concerning Education, London, July 1693, and again in 1693, 1694, 1695, 1698 and 1699. This treatise has been translated into many languages. The best English edition is edited with introduction and notes by R. H. Quick. Second edition. Cambridge, 1889.

The following brief articles by Locke on Education are of value:

a. Some Thoughts Concerning Reading and Study for a Gentleman. 1706.

b. Instructions for the Conduct of a Young Gentleman. 1706.

c. Of Study, 1677. See Lord King, Life of Locke, Bohn ed., pp. 92-109.

23. An Essay for Encouraging the Coining of Silver Money, and After for Keeping it Here. London, 1695.

24. Further Considerations concerning the Raising of the Value of Money; wherein Mr. Lownde's arguments for it in his last "Report Concerning the Amendment of the Silver Coin" are particularly examined. London, 1695.

25. The Reasonableness of Christianity as Delivered in the Scriptures. June 1695. Some theologians regard this as Locke's greatest work. Limborch preferred it to all systems of Divinity. Second edition, 1696. This work was attacked by Dr. John Edwards ("Some Thoughts Concerning Atheism," 1695, "Socinianism Unmasked," Jan. 1696), whereupon Locke wrote two elaborate vindications; the first in November 1695, the second in 1697. Bohn Library, 1850.

26. An Examination of Father Malebranche's Opinion of Seeing All Things in God. 1706. Written in 1695 as a new chapter for the fourth edition of the "Essay," but "to avoid controversy" was not introduced.

27. Remarks upon some of Mr. Norris' books, wherein he asserts Father Malebranche's Opinion of our Seeing All Things in God. Written in 1695. London, 1820.

28. Of the Conduct of the Understanding. 1706. Written in the winter of 1697 as an additional chapter to the "Essay" but not inserted. This very valuable treatise is edited by Thomas Fowler, with introduction and notes. Oxford, 1882.

29. A letter to the Right Reverend Edward (Stillingfleet) Lord Bishop of Worcester, Concerning Some Passages Relating to Mr. Locke's "Essay of the Human Understanding" in a Late Discourse of His Lordship in Vindication of the Trinity, London, 1697. The controversy between Locke and Stillingfleet occasioned a *second* reply to the Bishop of Worcester in 1697, and a *third* reply in 1698. These letters are indispensable to an understanding of the doctrine of the "Essay."

30. Elements of Natural Philosophy. A "very clever hand book," written before 1700, published 1720.

31. An Essay on Miracles. Written 1703, published 1706.

32. A Pharaphrase and Notes on the Epistles of Paul to the Galatians, First and Second Corinthians, Romans and Ephesians; to which is prefixed An Essay for the Understanding of St. Paul's Epistles by Consulting St. Paul himself. Appeared in six parts 1705 1707, and in many subsequent editions. See Am. Mo. Rev. Vol. 2:265.

33. A Fourth Letter for Toleration, 1706, a fragment written in 1704. See I. 7, and I. 18 c.

34. Memoirs Relating to the Life of Anthony, first Earl of Shaftesbury, 1706.

35. Some Familiar Letters between Mr. Locke and several of his friends. London, 1708. This volume comprises the mutual letters of Locke with Limborch and with Molyneux. They throw much light upon Locke's "Essay" and upon his general views of life.

36. Robert Boyle, History of the Air, edited by Locke with meteorological observations. (?) London, 1692. See Birch's Life of Boyle, p. 286.

37. Letters to Anthony Collins and Others. London, 1720.

38. Observations upon the Growth and Culture of Vines and Olives, written in 1679, published in London, 1766.

39. The following works frequently attributed to Locke may be regarded as doubtful :

a. Five Letters Concerning the Inspiration of the Holy Scriptures. 1690.

b. Occasional Thoughts in Reference to a Virtuous and Christian Life.

c. A Common-Place Book in Reference to the Holy Scriptures, 1697. Revised and improved by W. Dodd. London, 1828.

d. A Right Method for Searching After Truth.

e. Discourse of the Love of God;—in answer to John Norris.

f. A Version of Esop's Fables. 1703.

g. A History of our Saviour Jesus Christ, related in the Words of Scripture. 1705.

h. Introductory Discourse to Churchill's Collections of Voyages, containing a History of Navigation with a Catalogue of Books of Travel. 1704.

i. Select Moral Books of the Old Testament and Apochrypha Paraphrased. Published 1706.

40. There are still extant many unpublished manuscripts from the hand of Locke. A few of these are in the Remonstrants' Library at Amsterdam, some in the Bodleian Library at Oxford, many in the British Museum among the Shaftesbury papers, some at Hersley Park in the possession of Lord Lovelace, a descendant of Locke's cousin, Lord Chancellor King, and some in the possession of Mr. Stanford, of Nynehead, Taunton, inherited through Locke's friend, Edward Clarke, of Chipley.

41. The *first* edition of Locke's *works* was published in London in 1714, 3 volumes. (*a*) The *best* edition of his works is the eighth edition in four volumes, indexed and with "Defense of Mr. Locke's Opinion Concerning Personal Identity," edited by Edmund Law, Bishop of Carlisle, with Portrait, Expository Chart, Life and Critical Review of Works. London, 1777. (*b*) The Works of John Locke, with preliminary Essay and Notes by J. A. St. John. Bohn Library, London, 2 vols.

II. LIFE AND TIMES.

A satisfactory study of a philosopher demands not only a knowledge of his writings but also of his life and of his times.

1. THE LIFE OF LOCKE. Born at Wrington, near Bristol, August 29, 1632, died at Oates, the residence of Sir Francis Masham, about twenty miles from London, October 28, 1704.

a. **A. Wood** (Ath. Ox. Vol. 2nd.) Mentioned by Bishop Law, Locke's Works, vol. 1, page 3.

b. **Jean Le Clerc.** Eloge Historique de feu M. Locke, published in Bibliothèque Choisie in 1705, republished in London, with additions, 1713. This memoir was based upon the author's personal knowledge of Locke and upon letters from the third Earl of Shaftesbury and Lady Masham.

c. **M. Pierre Coste** (Locke's Amanuensis). A Letter printed in Bayle's Republique des Lettres in 1705.

d. Life and character of John Locke, published in the fourth edition of Some Familiar Letters, London, 1742, also separately with a portrait in 1742.

e. **Bishop Edmund Law.** Life of Locke, in the eighth edition of Locke's Complete Works. London, 1777.

f. **Lord King.** The Life of John Locke, with Extracts from His Correspondence, Journals and Common-Place Books. London, 1829; new edition, enlarged, in two volumes, London, 1830; again in Bohn's Library, 1858.

g. **H. R. Fox Bourne.** The Life of John Locke, two volumes. London, 1876. A work containing much new material. Invaluable for a study of Locke's life and teachings.

h. **M. Marion.** Locke, sa vie et ses oeuvres, d' après des documents nouveaux. Deuxième edition. Paris, 1893.

i. **John Brown.** Locke and Sydenham. Edinburgh and London, third edition, 1866.

j. **Dr. Thomas Foster.** Original Letters of John Locke, Algernon Sidney and Anthony Lord Shaftsbury. London, 1830. Second edition, 1847. See Fox Bourne, Life of Locke, II, 59, note. Professor Fraser credits Dr. Foster with an edition of "Some Interesting Letters from Locke to Benjamin Farley," 1830.

k. **M. Remusat.** Locke, sa vie et ses oeuvres, Revue des deux Mondes, Vol. XXIII, 1859.

l. **Thomas Fowler.** "Locke," in English Men of Letters Series, edited by John Morley. London and New York, 1881. Gives a very interesting review of Locke's life, but a very meager account of his philosophy.

m. **A. Campbell Fraser.** "Locke," in Philosophical Classics for English Readers, edited by William Knight. Edinburgh, London and Philadelphia, 1890 This is altogether the best available brief exposition of Locke's Life, Works and Philosophy. See also Fraser's article, "Locke," in Ninth Edition of the Encyclopaedia Britannica. See also notice in the Edinburgh Review, January 1891.

n. **W. D. Christie.** The Shaftesbury Papers. London, 1859. pp. 108–130. Not important.

o. Articles in magazines: Ed. Rev. 50 : 1. Westmin. 107 : 163. Harper's 53 : 917. Peop. Jour. 11 : 102. Am. Quar. 12 : 354. N. A. Rev. 29 : 78. Blackw. 39 : 798. Eclectic 102 : 715. Chr. Examiner 11 : 380. Mercersburg Rev. 7 : 375.

2. LOCKE'S TIMES (1632-1704). Locke's connection with Shaftesbury brings him into close contact with the most critical period of English History.

a. **Leopold Von Ranke.** A History of England, principally in the Seventeenth Century, six volumes. Oxford, 1876. The most satisfactory history of this period.

b. **Bishop Gilbert Burnet.** History of His Own Time. Two volumes. Oxford, 1847.

c. **T. B. Macauley.** The History of England from the Accession of James II. Five volumes. London and New York, 1879.

d. **Andrew Bisset.** The History of the Struggle for Parliamentary Government in England. Two volumes. London, 1877.

e. **Edward Earl of Clarendon.** The History of the Rebellion and Civil Wars in England, begun in the year 1641. Twelve volumes. London, 1850.

f. **Principal John Tulloch.** Rational Theology and Christian Philosophy in England in the Seventeenth Century. Two volumes. Edinburgh, 1874. Makes no mention of Locke but gives an admirable review of the Cambridge theologians.

g. **Leslie Stephen.** History of English Thought in the Eighteenth Century. Two volumes. London, 1876.

h. **F. E. Inderwick.** The Interregnum 1648-1660. Studies of the Commonwealth,—Legislative, Social and Legal. London, 1890.

III. LOCKE'S HISTORICAL RELATIONS.

A complete study of a philosopher involves an effort to determine his position in the history of Philosophy. This leads us into a study of the historical relations of Locke's system with those of his predecessors and successors.

1. LOCKE'S MORE INFLUENTIAL PREDECESSORS. Locke appears to have been fairly well acquainted with the history of Philosophy before his day. In Oxford he had lectured upon Greek and upon Moral Philosophy. The works of both Stanley and Cudworth were accessible to him. He was well acquainted with the Roman Stoics and Eclectics, especially with Cicero for whom he had a great admiration.

a. **Karl Winkler.** Locke's Erkenntnisstheorie vergleichen mit der des Aristoteles *Prog.* pp. 27, Villach, 1889. An able study.

b. **Walther Kueppers.** John Locke und die Scholastik, Berlin, 1895. *Diss.* pp. 44. Although Locke was acquainted with scholastic systems, this dissertation over-emphasizes his dependence upon them.

c. **H. Ruter.** Locke's Versuch über der menschlichen verstand auf sein originalität und neuheit hin untersucht. *Prog.* pp. 15, Halberstadt, 1886.

d. **Theodore Becker.** De Philosophia Lockii et Humii; Spinozismi Fructu, Criticismi Germine. pp.31, *Diss.* Halle, 1873.

e. **Thomas Hooker.** Ecclesiastical Polity. Exercised much influence upon Locke, who frequently speaks of the "learned and judicious Hooker."

f. **Lord Herbert of Cherbury,** whose "De Veritate" Locke possibly had in mind while writing the first Book of his "Essay." See article by W. R. Sorley, in Mind, October, 1894, on The Philosophy of Herbert of Cherbury.

g. **Kuno Fischer.** Bacon und seine Nachfolger. Second edition, thoroughly revised, Leipzig, 1875. An invaluable contribution to the study of Locke's Philosophical relations in the seventeenth and eighteenth centuries.

h. **Charles de Remusat.** Histoire de la Philosophie en Angleterre depuis Bacon jusqu' à Locke. Two volumes, Paris, 1875.

i. **W. Cunningham.** The Influence of Descartes on Metaphysical Speculation in England. London, 1876. pp 185.

j. **Dr. Sommer.** Locke's Verhältniss zu Descartes. pp. 63. *Diss.* Berlin, 1887.

k. **Dr. George Geil.** Ueber die Anhängigkeit Lockes von Descartes. Strasburg, 1887. *Diss.*

l. **Benno Erdmann.** Descartes und Locke, in Archiv für Philosophie, Band, II. pp. 99–122.

m. **Dr. Georg Freiherr von Hertling.** John Locke und die Schule von Cambridge. pp. XII. 319. Freiburg, 1892. Explains the intellectual elements of Locke's system by reference to the rationalistic movement in the Cambridge philosophers and theologians. A valuable contribution. It is probable that Locke had read, "An Elegant and Learned Discourse of the Light of Nature," by Nathaniel Culverwel, London, 1652.

2. LOCKE'S BRITISH SUCCESSORS.

a. **A. C. Fraser's** Edition of Locke's Essay, Oxford, 1895, traces the influence of Locke upon Berkeley and Hume, pp. 126–140.

b. **A. C. Fraser.** Selections from Berkeley, with introduction and notes, fourth edition, Oxford, 1891. See also Fraser's Collected Works of Berkeley, Volume IV.

c. **Thomas Reid.** Intellectual Powers, Chapter IX. The Scottish School claimed to build more consistently upon Locke than did either Berkeley or Hume.

d. **Dugald Stewart.** Works edited by Sir William Hamilton. Vol. V. pp. 58–87, Locke's Influence upon Berkeley and Hume.

3. LOCKE'S GERMAN SUCCESSORS. Locke's direct influence upon German thought is best seen in Leibniz, Wolf and Kant.

a. **Dr. G. Zart.** Einfluss der englischen Philosophie seit Bacon auf die deutsche Philosophie des 18ten Jahrhunderts, Berlin, 1881.

b. **Leibniz.** Nouveaux Essais sur l'Entendement Humaine. Sketched upon reading Locke's Essay, before 1695, written in 1704 but first published in 1765.

c. **Dugald Stewart.** Works edited by Hamilton, Vol. I, pp. 206–287, Historical and Critical Review of the Philosophical Works of Locke and Leibniz.

d. **G. Hartenstein.** Locke's Lehre von der Erkenntniss in Vergleichung mit Leibniz Kritik derselben. Leipzig, 1861 and 1865. Also in author's Hist. Abh. 1870.

e. **S. Turbiglio.** Analisi storica de la Philosophia de Locke e de Leibniz. Torino, 1867.

f. **Georg von Benoit.** Darstellung der Lockischen Erkenntnisstheorie in Vergleichung mit der von Leibniz. Bern, 1869.

g. **A. Kreil.** Bemerkungen über die jungste Schrift des Herrn Miotti, nebst einer Vergleichung der Lockischen, Leibnizischen und Kantischen Philosophie. Vienna, 1799. Account of the controversy in the Allgemeiner litterarische Anzeiger, 1799, under the title, Nachricht von einen neuen Angriff auf die Philosophie.

h. **Frank Thilly.** Leibnizens Streit gegen Locke in Ansehung der angeborenen Ideen. Heidelberg, 1891. *Diss.*

i. **Friedrich Herbst.** Locke and Kant, in ihrer Beziehung und ihrer Unterschiede. Stettin, 1869. pp. 29. *Diss.*

j. **Max Kissel.** De Ratione quae Lockii inter et Kantii placitia incedat. Rostock, 1869. *Diss.*

k. **M. W. Drobisch.** Locke der Vorläufer Kants. In Zeitschrift für exacte Philosophie. Bd. II, pp. 1-32. 1861.

l. **A. Borschke.** J. Locke in Lichte der Kantischen Philosophie. pp. 83, Wien, 1877. *Prog.*

m. **A. Seth.** Epistemology in Locke and Kant, Philosophical Review, 1893.

n. **H. Roepke.** Locke der Vorläufer Kants. *Diss.* pp. 38, Berlin, 1873.

4. FRENCH SUCCESSORS. The French admirers of Locke, Fontenelle (1657-1757), Voltaire (1694-1778), D'Alembert, Diderot, Helvetius, and Condillac (1715-1780), gave to Locke's Philosophy a sensualistic trend which it in no wise guaranteed. This trend of thought was vigorously attacked by De Maistre and by Cousin.

a. **Dugald Stewart.** Works edited by Hamilton, Vol. V, pp. 120-137, Locke's Influence upon the Philosophical Systems of France during the latter Part of the Eighteenth Century.

b. **Ph. Damiron.** Mémoires pour servir à l'histoire de la philosophie au XVIIIe siècle, tom. I et II, Paris, 1858, tom. III, avec une introduction par M. C. Dourand, Paris, 1864.

c. **Fr. Picavet.** Les Ideologues. Paris, 1891.

d. **J. E. Erdmann.** Die Entwicklung des Empirismus und Materialismus in der Zeit zwichen Locke und Kant. Entwicklung des Lockischen Princips durch Condillac, pp. 193-221.

5. GENERAL REFERENCES. For the historical-philosophical relations of Locke to both his predecessors and successors, as well as for brief expositions of his philosophy, the following works may be recommended:

a. **Kuno Fischer.** Bacon und seine Nachfolger. Second edition, Leipzig, 1875.

b. **Edward Grimm.** Zur Geschichte der Erkenntnissproblems, von Bacon zu Hume. Leipzig, 1890. A clear presentation of the main problems in Bacon, Hobbes, Locke, Berkeley, Hume.

c. **Ueberweg.** Grundriss der Geschichte der Philosophie, Die Neuzeit. Erster Band, 8te Auflage, bearbeitet und herausgegeben von Dr. Max Heinze, Berlin, 1896. An invaluable work for reference, especially for bibliography.

d. **Harold Hoeffding.** Geschichte der neueren Philosophie, Erster Band, Leipzig, 1895. An English translation is now being made. It treats of Locke, pp. 422-440, bringing his system into clear relations with the Renaissance and especially with the naturalistic trend of the seventeenth and eighteenth centuries.

e. **Wilhelm Windelband.** A History of Philosophy with especial reference to the formation and development of its problems and concepts. Translated from the German, New York, 1893. This work is a history of philosophy rather than of philosophers and their systems. For reference it is indispensable. Mention should also be made of Windelband's "Geschichte der neueren Philosophie in ihrem Zusammenhange mit der Allgemeinen Cultur und der besonderen Wissenschaften," Erster Band, Von der Renaissance bis Kant, Leipzig, 1878.

f. **Richard Falckenberg.** Geschichte der modernen Philosophie. Translated into English, New York, 1893. A very satisfactory history of modern Philosophy.

g. **Alfred Weber.** Histoire de la Philosophie Européenne. Cinquième Edition, Paris, 1892. English translation, New York, 1896. Locke's Philosophy, pp. 348-369, introduces the age of criticism and this drift is followed briefly but with clearness in England, France and Germany.

h. **W. E. H. Lecky.** History of the Rise and Influence of the Spirit of Rationalism in Europe. Two volumes, fifth edition. London and New York, 1872. The second volume is of special value.

i. **Wilhelm Dilthey.** Die Natürliche System der Geisteswissenschaft im Siebzehnten Jahrhundert. Archiv für Geschichte der Philosophie, Bde. V und VI.

j. **D. J. Morrell.** An Historical and Critical Review of the Speculative Philosophy of Europe in the Nineteenth Century. Second edition. London and New York, 1847.

k. **Noire's** Historical Introduction, pp. 113-361, especially 229-265, in the first volume of Max Muller's Kant's Critique of Pure Reason. London, 1881.

l. **J. D. Erdmann.** History of Philosophy, Vol. III.

m. **F. D. Maurice.** History of Moral and Metaphysical Philosophy. Two volumes.

n. **G. H. Lewes.** The History of Philosophy from Thales to Comte. Two volumes. Fifth edition, London and New York, 1880. Should be referred to as a characteristic English production taking the associational point of view and giving much attention to scientific movements and results.

o. **George S. Morris.** British Thought and Thinkers. Chicago, 1880.

IV. EXPOSITION AND CRITICISM.

Expository and Critical Accounts of Locke's Philosophy, chiefly as contained in his Essay Concerning Human Understanding. Locke's Philosophy has received the most diverse interpretations.

1. **Edward Stillingfleet, Bishop of Worcester.** A Discourse in Vindication of the Doctrine of the Trinity, London, 1696. In a chapter entitled, "Objections against the Trinity in Point of Reason," Locke's Essay was attacked, chiefly in reference to its doctrines of Substance and of Cause. This attack opened a controversy with Locke which throws much light upon his doctrine. See I. 29.

2. **John Serjeant.** Method to Science. Solid Philosophy asserted against the Fancies of the Ideists, London, 1697, attacks Locke's doctrines of Ideas and of Knowledge with what Locke called "Confused Notions."

3. **J. A. Lowde.** A Discourse on the Nature of Man, London, 1694, criticises unfavorably Locke's Logic and Ethics. Locke replies in "Epistle to the Reader" of the second edition of his Essay.

4. **W. Sherlock.** Discourses of the Immortality of the Soul and the Future State. London. 1704. Chapter 2, section 3, criticises Locke's attitude toward "Connate ideas or inbred knowledge." This book was sent to Locke about four months before his death by Anthony Collins.

5. **Henry Lee,** Rector of Tichmarsh in Northamptonshire. Anti-Scepticism or Notes upon each Chapter of Mr. Locke's Essay, with an explanation of all the Particulars of which he treats in the same order. Folio in four books, London, 1702. Dugald Stewart and Sir James Mackintosh regard Lee's work as a very judicious criticism and commentary.

6. **John Norris.** *a*. Christian Blessedness, or Discourses upon the Beatitudes * * * to which are added Reflections upon a Book called An Essay Concerning the Human Understanding. London, 1690.

b. An Account of Reason and Faith. London, 1695, thirteenth edition, 1740. (Indirectly related to Locke's "Essay.")

c. Essay towards the Theory of the Ideal or Intelligible World. Two volumes, 1704.

7. **Dr. John Edwards.** (1) Some Thoughts Concerning Atheism, 1695. (2) Socinianism Unmasked, January, 1696. (3) The Socinian Creed, 1696. (4) A Brief Vindication of the Fundamental Articles of the Christian Faith, etc, 1697. A series of scurrillous pamphlets directed chiefly against Locke's Reasonableness of Christianity. Locke is charged with Atheism and with taking "Hobbe's Leviathan for the New Testament, and the Philosopher of Malmesbury for our Saviour and the Apostles."

8. **Samuel Bold.** (*a*) A Tract in Vindication of Locke's "Reasonableness of Christianity" against Mr. Edwards' Animadversions. London, 1697. See I, 27.

b. Some Considerations on the Principal Objections and Arguments which have been published against Mr. Locke's Essay of Human Understanding. London, 1699. A very able defense with clear statements of points at issue.

c. Collected Tracts in Vindication of Locke. London, 1706.

9. **Vincent Perronet.** Vicar of Shurham in Kent. (*a*) A Vindication of Mr. Locke from the Charge of Giving Encouragement to Scepticism and Infidelity. 1736.

b. A Second Vindication. 1738.

10. **Catherine Cockburn.** (*a*) A Defense of Mr. Locke's Essay. London, 1702.

b. Essay Concerning the Foundation of Moral Duty with a Defense of Mr. Locke, edited by Thomas Birch. London, 1751.

11. **G. W. Leibniz.** Nouveaux Essais sur l'Entendement Humaine. Roughly sketched before 1696, probably written in 1704 or 1705, but first published in 1765. In the opinion of many this is the most valuable criticism the Essay has received.

a. **Henri Lachelier.** Nouveaux Essais sur l'Entendement Humaine de Leibniz, publiés avec une Introduction, des notes et un appendice. Paris, 1886.

b. **John Dewey.** An Exposition of Leibniz' New Essay, in Griggs's Philosophical Classics. Chicago, 1888.

c. **George M. Duncan.** The Philosophical Works of Leibniz. New Haven, 1890.

d. **A. G. Langley.** Leibniz' New Essay Concerning the Human Understanding. Translated, together with an appendix consisting of some shorter pieces, with introduction and copious notes. New York, 1896.

A rough draft of Leibniz' criticism on Locke's Essay found its way to Locke through Thomas Burnet sometime in 1696. Leibniz' letter sending the sketch is dated 7th–17th March, 1696, and Locke writes to Molyneux concerning the criticism in letters dated Feb. 22, 1697, April 10, 1697, and May 3, 1697, all of which somewhat disparage the criticism of Leibniz.

12. **Victor Cousin.** Ecole Sensualiste,—Système de Locke. Paris, 1829. Also Philosophie de Locke. Sixth edition, Paris, 1873. Translation by C. S. Henry, under the title, "Elements of Psychology," New York, 1834. Cousin's Système de Locke, is found in the second volume of O. W. Wight's translation "Course of the History of Modern Philosophy," by Victor Cousin, two volumes, New York, 1854. Cousin's criticisms are severe and frequently unjust.

13. **Henry Rogers.** John Locke, His Character and Philosophy, Edinburg Review, April, 1853, also in "Select Essays," volume two. An able and sympathetic exposition emphasizing the intellectual elements.

14. **Edward Tagart.** Locke's writings and Philosophy Historically considered, and Vindicated from the Charge of Contributing to the Scepticism of Hume. London, 1855.

15. **B. H. Smart.** Thought and Language, London, 1865, has in view the establishment of the Philosophy of Locke.

16. **Sir William Hamilton.** *a*. Lectures on Metaphysics. 2 volumes, see index.

b. Lectures on Logic. 2 volumes, see index.

c. Reid's Collected works. See Dissertations.

Hamilton agrees in the main with Cousin and regards Locke as a sensualist after the manner of Gassendi.

17. **Thomas E. Webb.** (*a*) The Intellectualism of Locke. Dublin, 1858. Professor Webb contends with much force that Locke is an Intellectualist.

b. The Veil of Isis, London, 1855, has a note "Locke on the Origin of Ideas," pp. 335-344.

18. **E. Schaerer.** John Locke, Seine Verstand Theorie und seine Lehren über Religion, Staat und Erziehung, Psychologisch und Historisch, dargestellt. Leipzig, 1860.

19. **J. H. Von Kirchmann.** Erläuterung zu John Locke's Versuch über den menschlichen Verstand. Two parts. Berlin, 1873 and 1874, pp. 303. Many valuable remarks.

20. **R. Cleary.** An Analysis of Locke's Essay on the Human Understanding. Second edition revised and enlarged. Dublin, 1878. An admirable handbook for the study of the Essay.

21. **T. H. Green.** Introduction to the Green and Grose Edition of Hume's Treatise of Human Nature. Vols. one and two, Oxford, 1875. Second edition, 1889. The same contained in the Works of Thomas Hill Green, edited by R. H. Nettleship, in three volumes, second edition, London, 1890, pp. 1-373. Green's exposition and criticism is an anachronism in so far as Locke is viewed through an Hegelian vista.

22. **Guiseppe Tarantino.** Giovanni Locke, studio storrico, Milano, 1886. Estrato dalla Rivista de Filosofia scientifica. Serre 2d. Anno V, vol. V. Settembre, 1886.

23. **T. Ziemba.** Locke und sein Werk. Lemberg, 1870.

24. **R. Vaughn.** Locke and his Critics, British Quarterly, Vol. V. Also Essays Vol. II, pp. 59-120. London, 1849.

25. **Sir James Mackintosh.** On the Philosophical Genius of Lord Bacon and Mr. Locke. Miscellaneous Works. Vol. I. London, 1846.

26. **Noah Porter.** Marginalia Lockeana, New Englander and Yale Review, vol. 47, p. 33, July, 1887. Thomas Burnet attacked Locke's Essay in three pamphlets, 1697-1699. The third pamphlet came into the possession of Yale College from Locke's own Library annotated by Locke's own hand. It is of great value on many points of controversy.

27. **W. Hazlitt.** Essay on Locke's Essay on the Human Understanding in his "Literary Remains." New York, 1836.

28. **John E. Russell.** The Philosophy of Locke in Extracts from the Essay on the Human Understanding, arranged with introductory notes. New York, 1891.

29. **Richard Burthogge.** On Reason, and the Nature of Spirits. Also author of a Letter to Mr. Locke 'On the Soul of the World and of particular Souls,' in Lord Somers' Tracts, Vol. II, 1694. See Morris' translation of Ueberweg's History of Philosophy, Appendix by Noah Porter, Vol. II, pp. 364-369, for notice of some of the early critics and defenders of Locke.

30. **Peter Browne,** Provost of Trinity College. The Procedure and Limits of the Human Understanding. London, 1728. Second edition, 1729

31. **Zachary Mayne.** Two Dissertations Concerning Sense and the Imagination, with an Essay on Consciousness. Published anonymously in 1727.

32. **A. C. Fraser.** The best exposition of Locke's Philosophy is found in the edition of Locke's Essay Concerning the Human Understanding, collated and annotated with prologomena, Biographical, Critical and Historical, by Alexander Campbell Fraser, two volumes. Oxford and New York, 1894.

V. SPECIAL ASPECTS OF LOCKE'S PHILOSOPHY.

Locke's Essay was begun as a prologomenon to ethics and religion. See "The Epistle to the Reader" and "Introduction," § 7. In its elaboration it may be regarded as a general theory of knowledge. Locke discussed with Molyneux whether it should be regarded as logic or metaphysics. It has most often been called a system of psychology. The "Essay" touches all parts of philosophy. Therefore we somewhat arbitrarily classify expositions and criticism of special aspects of Locke's Philosophy, as found in his "Essay" and other writings, under the following heads:

1. *PSYCHOLOGY* was regarded by Locke as the foundation for Philosophy.

a. **Friedrich Harms.** Geschichte der Psychologie. 2nd. ed. Berlin, 1879.

b. **Robert Jardine.** The elements of the Psychology of Cognition. 2nd. edition. London, 1884. Chapter III, "Theories of Perception from Descartes to Kant."

c. **Theodore Loewy.** Die Gemein-Ideen des Gesichts und Tastsinns nach Locke und Berkeley. Leipzig, 1884.

d. **Alexander Bain.** Mental and Moral Science, External Perception and History of British Theories. pp. 188-214.

e. **M. Maher.** Psychology. 2nd. edition (Stonyhurst series). New York, 1892. pp. 89-116. A critical sketch of the leading theories of external perception.

f. **Sir William Hamilton.** Collected Works of Reid. Fourth edition. Edinburg, 1854, Contains invaluable dissertations. See note C on Theories of External Perception, pp. 816-825. Note D on the Distinction of Primary and Secondary Qualities of Body, p. 825, and Note D* on the History of the distinctions of Perceptions and Sensations.

2. *INDUCTIVE LOGIC*. Locke is a link between Aristotle and J. S. Mill.

a. **Friedrich Ueberweg.** System der Logik und Geschichte der Logischen Lehren. Fünfte Aufgabe, bearbeitet von J. B. Meyer. Bonn, 1882.

b. **Robert Blakey.** Historical Sketch of Logic. London, 1851. See pp. 271-380.

c. **Friedrich Harms.** Geschichte der Logik. Berlin, 1881.

d. **Ed Martinak.** (1) Zur Logik Lockes, Lehre von der Verstellungen. Graz, 1887. (2) Die Logik John Lockes, zusammengestellt und untersucht. pp. VIII, 151. Halle, 1894.

e. **William Whewell.** (1) The History of scientific Ideas, 1858. (2) The Philosophy of Discovery, 1860.

f. **Alexander Bain.** Mental and Moral Science. Appendix pp. 1-33 on the History of Nominalism and Realism.

g. **Isaac Watts.** Philosophical Essays with Remarks on Locke. London, 1732.

h. **C. Lofft.** Gilbert's Law of Evidence, with an abridgment of Locke. London, 1796.

i. **J. P. Mahaffy** on Locke's Anticipation of Mill. In Mind, I, 287.

j. **F. Ryland.** Locke on Words. 3d Book of Essay. London, 1882.

k. **Friederick Perle.** Lockes Ansicht von der Sprache. *Prog.* Halle, 1883.

3. In *EPISTEMOLOGY* Locke finds four problems, viz.: the origin, the certainty, the nature and the limits of knowledge.

a. **Franz Erhardt.** Erkenntnisstheorie. Leipzig, 1894.

b. **Al. Schmidt.** Erkenntnisslehre. Two vols. Freiburg, 1890.

c. **L. T. Hobhouse.** The Theory of Knowledge. London and New York, 1896.

d. **Edward Grimm.** Zur Geschichte des Erkenntnissproblems von Bacon zu Hume. Leipzig, 1890.

e. **Richard Falckenberg.** History of Modern Philosophy. pp. 155-176, on Locke's Theory of Knowledge.

f. **Edmund Koenig.** (1) Die Entwicklung des Causalproblems von Cartesius bis Kant. pp. IV, 340. Leipzig, 1885. (2) Ueber der Substanzbegriff bei Locke und Hume. Leipzig, 1881.

g. **Alexander Bain.** Mental and Moral Science. Appendix pp. 33-78 on the history of the theories of the origin of knowledge—Experience and Intuition.

h. **A. Riehl.** Der Philosophische Kritizismus. Two volumes, 1876-1887. The first volume gives a brief historical statement beginning with Locke.

i. **Ludwig Busse.** Philosophie und Erkenntnisstheorie. Bd. I, 1894. gives a critical objectification to the various epistemological tendencies.

j. **R. Palm.** Wie Begründet Locke die Realität der Erkenntniss. *Diss.* pp. 42. Jena, 1881.

k. **G. W. Manly.** Contradictions in Locke's Theory of Knowledge. *Diss.* pp. 67. Leipzig, 1885.

l. **A. Foots.** Lockes Erkenntnisstheorie. *Diss.* Würtzburg, 1894.

m. **James McCosh.** Locke's Theory of Knowledge with a notice of Berkeley. New York, 1884, and London, 1886.

n. **G. Hartenstein.** Lockes Lehre von der Erkenntniss in Vergleichung mit Leibniz Kritik derselben. Leipzig, 1861 and 1865. Also in Author's Hist. Phil. Abh. 1870.

o. **F. Bowen.** Locke and the Transcendentalists, Critical Essays. Boston, 1842, and Chris. Examiner, 23:173.

p. **Dr. Laws.** Beurtheilung der Lockeschen, Leibnizchen und Kantischen Erkenntnisstheorie vom Standpunkte des absoluten Idealismus.

q. **J. Raffel.** Voraussetzungen welche den Emprismus Lockes, Berkeleys und Humes zum Idealismus führten. *Diss.* Berlin, 1887.

r. **E. Stoetzl.** Kritik der Lockeschen Erkenntnisslehren. Berlin, 1869. *Diss.*

s. **Karl Winkler.** Lockes Erkenntnisstheorie vergleichen mit der des Aristotles. *Prog.* pp. 27. Villach, 1889.

t. **Ferdinand Zitcher.** Der Substanzbegriff bei Locke. pp. 11. Leipzig, 1889. *Diss.*

u. **A. de Fries.** Die Substanzlehre John Lockes mit Bezug auf Cartesius kritisch entwickelt und untersucht. Berne, 1879.

v. **A. C. Fraser** in his Edition of Locke's Essay, Volume I, Introduction. pp. liv—cxxvi, gives a critical account of Locke's Theory of Knowledge.

4. *ETHICS.*

a. **Henry Sidgwick.** Outlines of the History of Ethics. Third edition. London, 1892.

b. **Friedrich Jodl.** Geschichte der Ethik in der Neueren Philosophie. Two vols. Stuttgart, 1882.

c. **Catherine Cockburn.** Essay Concerning the Foundation of Moral Duty, with a Defense of Mr. Locke, edited by Dr. Birch, 1751.

d. **W. Whewell.** History of Moral Philosophy in England. London, 1852 and 1868.

e. **T. H. Green.** Locke's Moral Theory. Works I: 301-320.

f. **Alexander Bain.** Liberty and Necessity with a history of the Free Will Controversy. In "Mental and Moral Science." pp. 396-428.

g. **B. Muenz.** Lockes Ethik. Philos. Monatshefte. Band XIX. pp. 344-354, 1883.

h. **Franz Vorlaender.** Geschichte der philosophischen Moral, Rechts-und Staats-Lehre, der Engländer und Franzosen. Marburg, 1855. An excellent ethico-political review from Machiavelli to the French Revolution.

i. **P. Geyer.** Locke's View on Punishments and Rewards. *Diss.* pp. 14. Buntenhunde, 1883.

j. **M. M. Curtis.** An outline of Locke's Ethical Philosophy. Leipzig, 1890. pp. VIII, 145, *Diss.*

k. **James Gibson.** Locke's Theory of Mathematical Knowledge and of a Possible Science of Ethics. Mind, n. s. no 17. pp. 38-59.

l. **G. Scheurmann.** Lockes Erziehung des Willens. pp. 40, *Diss.* Gütersloh, 1876.

m. **Robert Blakey.** History of Moral Science. 2 volumes. Second Edition. Edinburgh, 1836. Vol. I, Chapter six, gives a brief sketch of Locke's Ethics as seen in his "Essay."

n. **Hermann Winter.** Darlegung und Kritik der Lockeshen Lehre vom Empirischen Ursprung der sittlichen Grundsätze. Bonn, 1884, pp. 62, *Diss.*

5. *POLITICS AND ECONOMICS.*

a. **Paul Janet.** Histoire de la Science Politique dans ses Rapports avec la Moral. Second edition, two volumes. Paris, 1872. See also article in Revue des Deux Mondes, 1875.

b. **J. C. Bluntschli.** Gesch. des allgem. Staatsrechts u. d. Politik seit d. 16. Jahrh, bis zur Gegenwart. München, 1884.

c. **Fr. Pollock.** An Introduction to the History of the Science of Politics. London and New York, 1890.

d. **Thomas H. Green.** Locke's Theory of the State. Works II, 374-385.

e. **J. Held.** Locke als Staatsphilosoph. Leipsic, 1863.

f. **Dr. Joseph Powers.** Vindication of Locke's Political Principles. Written by order of Queen Caroline. London, 1794.

g. **Wilhelm Roscher.** Zur Geschichte der Englischen Volkswirthschaftslehre. Leipsic, 1851. "Locke ist der früheste grosse Systematiker der Volkswirthschaft."

h. *The Monthly Repository* for 1818, Vol. 13, contains the entire correspondence of Locke with Limborch relating to "The Act of Toleration," of which Locke is supposed to be the author.

i. **Wilhelm Hasbach.** Die allegemeinen philosophischen Grundlagen die von Francois Quesnay und Adam Smith begründeten politischen Oeconomie. Leipsic, 1890. This work gives a good review of the doctrine of Natural Law from the Epicureans and Stoics to Locke, pp. 1-48, and then takes up Locke and his disciples, pp. 48-91.

j. **Geo. Bancroft.** History of the United States, Vol. I, Chapter vii, pp. 408-429, "Locke's Legislation for Carolina."

k. **Th. Pietsch.** Ueber das Verhältniss der politischen Theorie Lockes zu Montesquieus Lehre von der Theilung der Gewalten. *Diss.* pp. 30. Breslau, 1887.

6. *THEOLOGY AND RELIGION.*

a. **Bernhard Punjer.** History of the Christian Philosophy of Religion from the Reformation to Kant. Translated from the German. Edinburgh, 1887. XIX, 660. Excellent Review of English Deism, pp. 285-389.

b. **G. V. Lechler.** Geschichte des Englischen Deismus. Stuttgart, 1841. "A work of rare objectivity and reliability."

c. **John Leland.** A View of the Principal Deistical Writers. London, 1754.

d. **Henke.** Kirchengeschichte des 18ten Jahrhunderts. Leipsic, 1804, II Theil, secs. 1-10. "Darstellung der Debatten zwischen Deisten und Orthodoxen."

e. **Ludovico Carrau.** La Philosophie Religieuse en Angleterre depuis Locke jusqu' à nos jours. Paris, 1888.

f. **Thomas H. Green.** Locke's View of God and the Soul. Works, I, pp. 107-131.

g. **W. Carroll.** Dissertation on the tenth Chapter of Locke's Essay, wherein that Author's Endeavours to establish Spinoza's Atheistical Hypothesis are confuted. London, 1706.

h. **P. Fisher.** Die Religionsphilosophie John Lockes. *Diss.* Erlangen, 1893.

i. **Dr. Geil.** Die Gottesidee bei Locke und dessen Gottesbeweis. Archiv für Gesch. d. Philos. Bd. III, pp. 579-596. 1890.

j. Locke an Independent. Cong. Mag. XV, 654.

k. **E. E. Worcester.** The Religious Opinions of John Locke. *Diss.* pp. 124. Leipsic, 1891.

l. Locke on the Epistles of St. Paul. Am. Mo. Rev. II, 265.

7. *EDUCATION.*

a. **R. H. Quick's** edition of Locke's Some Thoughts concerning Education, second edition, Cambridge, 1889, is well edited with notes and discussions, explanatory and critical.

b. German Histories of Education. (1) **Karl Schmidt's** Geschichte der Pädagogik. Vierte Auflage, Dritter Band. Köthen, 1883. On Locke, pp. 300-324. (2) **K. A. and Georg Schmid.** Geschichte der Erziehung, Dritter Band. Stuttgart, 1891. (3) **Karl von Kaumer.** Geschichte der Pädagogik. Zweiter Theil, vierte Auflage. Gütersloh, 1872.

c. **E. Fritsche.** John Lockes Ansichten über Erziehung. Naumberg, 1866. *Diss.*

d. **Karl von Raumer.** "John Locke." Am. Journal Ed. VII, 209.

e. **M. Geutzsch.** Darstellung der Paedagogik John Lockes mit Berücksichtigung ihrer philosophischen Vorbedingungen. pp. 55. Penig, 1890. *Diss.*

f. **J. Peters.** John Locke als Paedagogische Schriftsteller. *Diss.* Leipsic, 1872.

g. **V. Saftu.** Ein Vergleichung der Philosophischen Erziehung Locke und Rousseau. *Diss.* pp. 75. Bucharest, 1889.

h. **J. Gavanesoul.** Paedagogische Ansichten John Lockes in zusammenhang mit seiner Philosophie. pp. 84. Berlin, 1888. *Diss.*

i. **Adolph Stapelfeld.** Locke on Education. *Diss.* pp. 29. Crimmitschau, 1878.

j. **Ernst Zaubitzer.** Locke als Paedagogue, 2 Hefte. Weimar, 1880.

k. **O. Dost.** Die Pädagogik John Lockes in zusammenhang mit seiner Philosophie. Plauen, 1877. *Diss.*

l. **W. Gitschmann.** Die Pädagogik des John Locke. Köthen, 1881. *Diss.*

m. **R. N. Coswin.** Die Erziehungslehren Lockes und Rousseaus. *Diss.* Heidelberg, 1895.

MATTOON M. CURTIS.

NOTICES.

The following extracts are from reviews of Professor Morley's great work "On the Densities of Oxygen and Hydrogen and on the Ratio of their Atomic Weights. Published by the Smithsonian Institution, Washington, D. C. 1895. 4to. xi. 117 pp."

Professor W. A. Noyes, of the Rose Polytechnic Institute, says in *Science* for January 3rd, 1896, pp. 25-6: "For more than ten years Professor Morley has been almost constantly engaged on the work which is described in this paper. With a painstaking fidelity to the highest ideals of accurate work which has rarely been equalled and has never been surpassed, he has determined four constants which are partly independent, and which are of very great importance in physical science. These constants are: the density of hydrogen, the density of oxygen, the ratio of the combining volumes and the ratio of the combining weights of the two elements. * * * * It is impossible in a brief sketch of this kind, to convey any adequate idea of the pains which were taken at every step to secure the greatest possible accuracy in the work, nor of the genius which has been displayed in devising complicated apparatus adapted for the determinations to be made. The work is classical, and must, hereafter, be consulted by everyone who wishes to do the best work in this field."

In the *Journal of the American Chemical Society* for February, 1896, p. 196, F. W. Clarke, Chief Chemist of the United States Geological Survey, says: "It is hard to express an opinion concerning this great investigation, without seeming to be extravagant. In thoroughness, foresight, and manipulative skill, it stands in the very front rank of chemical investigations, and on the same plane with the classical researches of Stas. In short, it is doubtful whether any better work of its kind has ever been published, and it has very few peers. To fully appreciate the memoir it must be studied in detail and at first hand; even Morley's own abstracts in various chemical journals fail to give an adequate impression of the magnitude of his achievement. The paper may at once take its place among 'the classics of the exact sciences'."

In the March number of the same journal, the same reviewer says (p. 200): "It is impractical in a report of this kind, to go into the details of so elaborate an investigation as this of Morley's, and a bare statement of results must suffice. The research, however, is one of the most perfect of its kind, every source of error having been considered and guarded against, and it will doubtless take its place in chemical literature as a classic. Independently of its main purpose, the book is almost a manual on the art of weighing and measuring gases, and no experimenter who engages upon work of that kind, can afford to overlook it."

In *Nature* for July 16th, 1896, pp. 258-60, E. C. C. Baly writes: "In all his experiments Dr. Morley dealt with far larger volumes of purer gases than previous experimenters had used, and in weighing them he reduced with surprising completeness every possible source of error. * * * * All experiments dealing quantitatively with gases are naturally extremely difficult, but Dr. Morley has, by paying attention to every detail, brought each process to a great pitch of accuracy. * * * The extremely ingenious forms of apparatus he used for his many determinations are especially worthy of remark; and these, together with the extraordinary care bestowed in their use, combine to make the whole rank among the finest investigations of modern science."

UNIVERSITY INTELLIGENCE.

THE COMMENCEMENTS OF THE UNIVERSITY.

DENTAL COLLEGE.

The Third Commencement of the Dental College was held on Tuesday, May 9th, in the Association Hall, with an address by Reverend Dr. J. M. Buckley, of New York.

MEDICAL COLLEGE.

The Fifty-second Commencement of the Medical College was held on Wednesday, May 20th, in the Association Hall, with an address by President Wm. F. Pierce of Kenyon College.

COMMENCEMENT WEEK.

The exercises of Commencement week began somewhat earlier than usual this year, the first public occasion being a concert given by the Glee and Mandolin Clubs of Adelbert College and the College for Women on Thursday evening, June 11th, in Beckwith Church.

On Saturday evening, June 13th, occurred the speaking of Orations by Members of the Sophomore and Junior Classes of Adelbert College, also in Beckwith Church. The following men took part:

From the Sophomore Class:—Homer Day Rankin—"The Aristocracy of the American College." Henry Edgerton Freeman—"The Wandering Jew." Hubert Alonzo Lane—"The Influence of Opinion." George Wheeler Shaw—"Our Navy."

From the Junior Class:—Franklin Turner Jones—"Marquette." Lewis Hodous—"The Causes of War; How Removed." Frederic Marcus Wood—"The Practical Value of a College Course." Edward Lewis Dodd—"Jefferson Davis."

The first prize of $50.00 to a member of the Sophomore Class was awarded to H. A. Lane; the first prize of $50.00 to a member of the Junior Class was awarded to Lewis Hodous, and the second prize of $30.00 irrespective of class, to F. T. Jones.

On Sunday evening President Thwing preached the Baccalaureate Sermon to the members of the graduating classes of Adelbert College and the College for Women, in Beckwith Church.

Monday morning, at ten o'clock, the Class Day exercises of the graduating class of Adelbert were held in the college chapel. The usual program of history and prophecy was carried out.

In the afternoon the same exercises of the graduating class of the College for Women were held in Clark Hall, rain preventing the original plan of having them on the campus from being followed.

DEDICATION OF THE HATCH LIBRARY BUILDING.

At four o'clock Monday afternoon, the Hatch Library, the corner-stone of which had been laid just one year before, was dedicated.

The presentation was made by the donor, Mr. H. R. Hatch, and the building formally accepted by the President.

The address of the occasion was on the "Intellectual Development of Cleveland," by Professor M. M. Curtis. Unfortunately Professor Curtis was too ill to be present and the address was read by Mr. Harry Jeschke of the class of 1894. The prayer of dedication was made by the Rev. Dr. S. P. Sprecher.

LAYING THE CORNER-STONE OF LAW SCHOOL BUILDING.

At half past five on the same day the corner-stone of the new Law School building on Adelbert Street was laid with appropriate ceremonies. The address was delivered by Judge Henry C. White, the prayer made by the Rev. Dr. Gilbert, and the stone laid by the Dean, Professor Hopkins, the members of the Faculty and donors.

The box deposited in the corner-stone contains: The Catalogue of the University for 1895-96; the Report of the President and Faculties for 1895-96; copies of the Western Reserve Law Journal; the Eighty-Ninth Annual Report of the Board of Education of Cleveland; copies of the recent publications of the University; copies of the daily newspapers of Cleveland.

In the evening the Second Commencement of the Law School was held in Beckwith Church. The address was delivered by the Rev. Dr. H. C. Haydn on "The Triumph of Reason and Conscience over Brute Force in International Relations."

THE COLLEGE FOR WOMEN.

On Tuesday at 2:30 p. m., the Sixth Commencement of the College for Women was held in Calvary Church.

The address was delivered by Nicholas Murray Butler, Professor of Philosophy and Education in Columbia University. It dealt with some phases of our modern educational system, and was a masterly presentation of the subject.

ANNUAL MEETING OF THE ALUMNI ASSOCIATION.

At five o'clock on Tuesday the Alumni held their annual meeting in the Adelbert College chapel. Dr. O. C. Kendrick, '44, presided.

Officers for the ensuing year were elected as follows: President, E. P. Williams, '64; 1st Vice-President, S. P. Wolcott, '62; 2d Vice-President, W. B. Porter, '63; Rec. Secretary, Dr. K. F. Smith, '79; Cor. Secretary, E. O. Stevens, '88; Necrologist, Rev. A. C. Ludlow, '84.

G. H. Ford, '62, Rev. A. C. Ludlow, '84 and Rev. D. T. Thomas, '85, were appointed Visitors for the ensuing year.

The Necrologist reported the death during the year of the Rev. Sanford Rockwell Bissell, '43, Rev. Jared Waterbury Scudder, '50, Rev. John Ludlow Kendall, '68, Rev. William Gurney Jenkins, '74, Israel Holly King, '75, and of Capt. George E. Paine, who died the previous year, but whose death had not been reported.

A committee was appointed to consider the establishment of an Alumni Tree Day, with a view to the adornment of the college campus. This committee consists of H. W. Woodward, '90, Chas. H. Taylor, '93 and E. P. Williams, '64.

In the evening at Beckwith Church, the annual address before the Alumni Association was delivered by the Rev. Dr. H. C. Haydn on "One Hundred Years in the Religious Life of Cleveland and Seventy Years in the Life of the First College."*

ADELBERT COLLEGE.

Wednesday morning the Seventieth Commencement of Adelbert College was held in the Euclid Ave. Congregational Church. A large number of the trustees, members of faculties, alumni and students assembled at the College and marched to the church. Orations were delivered by five members of the graduating class, and degrees conferred. The honorary degree of LL.D. was conferred upon Thomas Wentworth Higginson, and that of D. D. upon the Rev. Nelson Beach of Minneapolis.

At the close of the commencement exercises a procession was formed and marched to the Adelbert College chapel, where the Alumni Lunch was served. The Secretary of the Association, Dr. K. F. Smith, '79, presided, and the following persons responded to his call: President Thwing for the University, Professor Fuller for the Adelbert Faculty, Mr. R. C. Parsons for the Trustees, Mr. B. P. Bole for the graduating class, Dr. N. S. Burton for the class of 1846, Hon. S. P. Wolcott for 1862, Dr. G. E. Smith for 1855, and Rev. C. L. Richards for 1874.

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*Note.—This address is printed in this number of the Bulletin, pp. 76-85.

φ B K.

In the afternoon at 3:30 the Alpha convened in the Latin room of Adelbert College, the Vice-President, Mr. E. C. Williams in the chair. The following men were elected to membership in the society: From the Class of '96, Arthur Warren Colby; from the Class of '97, Edward Lewis Dodd, Lewis Hodous, David Gaul Jaeger, and William Fielder Sanders.

The following officers for the ensuing year were elected: President, S. E. Williamson, '64; Vice-President, E. C. Williams, '92; Secretary, C. J. Smith, '70; Treasurer, E. S. Claflen, '95.

The question of a φ B K oration for next year was referred to a committee consisting of the Secretary (Chairman), President and Vice-President of the Alpha, and the President of the University.

DEGREES.

The President conferred the honorary degrees in the following words:

Thomas Wentworth Higginson, hodie magno cum gaudio honestamus. Universitatis Americanensis veterrimae alumnum, nunc omnium civium suorum qui litterarum humanitatisque studiosi sunt decanum, iam pridem oportuit honoribus maximis academicis adornatum esse. De patria sua quoque optime meruit quippe qui pro servis voce stiloque per multos annos enisus, fortissime in bello civili pugnaverit atque famam magnam consecutus sit. In scribendo est ei magna facultas, copia, ubertas atque semper perspicuitas. Non uno generi componendi deditus, in historiam, res fictas et saturam scribendo, gratiam apud omnes iniit, atque in iudicio magna laude se dignum praebuit. Ob haec merita, gradu amplissimo Legum Doctoris a nobis—qui ex hoc nosmet aequo honore afficimus—adornatur.

David Nelson Beach, vir strenuus, ingeniosus, animi magni, reipublicae studiosus, qui ad theologiam se diu applicaverit ut haec scientia latius potens humanior fiat et hoc consilio libros dissertationesque nonnullos ediderit, quaestiones hodiernas cum cura inquirens, vita sanctissima, gradu amplissimo Divinitatis Doctoris a nobis adornatur.

Degrees were conferred by Adelbert College of Western Reserve University upon the following persons:

The degree of Master of Arts upon John Marvin Ingersoll, Robert Eugene Ruedy, John James Thomas.

The degree of Bachelor of Arts upon Howard Harrison Beck, Emory Llewellyn Dial, Henry Courtney Evans, Howell Merriman Haydn *Summa cum laude*, William Rowland Hopkins (Salutatory Honor), Robert Louis Hubler, William Gale Meade, Earl Roy Myers, Charles Wesley Naumann, Carl Frederick Shuler, Rollin Harvelle Tanner (Valedictorian) *Magna cum laude*, August Wetzel, Benj. Breckenridge Wickham (Third Philosophical Honor), Hugh Williams, Duncan Brewster Wolcott, Edward Richard Wright.

The degree of Bachelor of Letters upon Arthur Warren Colby (Second Philosophical Honor) *Magna cum laude*, Max Emory Hessler, Will Charles Manchester, Walter Gustave Stern.

The degree of Bachelor of Philosophy upon Benjamin Patterson Bole, Henry Irving Cozad, James Alexander Robertson (First Philosophical Honor) *Magna cum laude*, Frank Stahl.

Honors and prizes were given by Adelbert College of Western Reserve University to the following persons:

Two-year honor in Greek to Harvey William Hurlebaus, Paul Russel Pope.

Two-year honor in Latin to Paul Russel Pope.

Junior honors. Equal scholarship honors to Edward Louis Dodd, Lewis Hodous, David Gaul Jaeger, William Fielder Sanders.

Group honors. Philosophical group, first honor, William Rowland Hopkins; second honor, Edward Richard Wright. Romance group, first honor, Arthur Warren Colby.

President's prizes, for best Junior and Sophomore Orations, first Junior prize, Lewis

Hodous. First Sophomore prize, Hubert Alonzo Lane. Second prize (awarded irrespective of class), Franklin Turner Jones.

For the highest records in Ancient and Modern Languages for the Freshman year, first prize, Julian Woodworth Tyler. Second prize, Roscoe Milliken Packard, Dudley Lytton Smith.

For the highest records in Mathematics, first prize, Roscoe Milliken Packard. Second prize, Arthur William Davidson.

For the highest records in Gymnasium work, Freshman Class, Sylvester Loy Bissell.

The Handy Philosophical prize, William Rowland Hopkins.

Harriet Pelton Perkins Scholarship for the highest records in English, Lewis Hodous.

The following degrees were conferred by Western Reserve University:

On June 16th, the degree of Bachelor of Arts upon Sarah Alvira Adams, Florence Gertrude Bell, May Cole, Mary Amanda Crowe, Alice Maude McKinley, Mary Franc Mattison, Ruby Elberta Miller, Meta Wilhelmina Peters, Ethel King Smith, Ruth Peet Smith.

On June 16th, the degree of Bachelor of Letters upon Mary Alice Arter, Emma Georger Brassington, Mary Fairfield Coit, Katharine Croxton, Clara May DeGroodt, Hattie Belle Denison, Ethel Lynn Griste, Bertelle Maude Lyttle, Alice May Stebbins, Blanche Evalyn Straight, Mabelle Estelle Van Cleve.

On June 16th, the degree of Bachelor of Philosophy upon Alta Marilla Barker, Mary Margaret Barnes, Frances Maude Glidden, Bertha May Hulett, Mary Irene McHannan, Clara Belle Myers, Bessie DeKalb Pease, Daisy Helen Robbins, Ellen Arvilla Van Fleet, Lula Jean Van Fleet.

On June 16th, the degree of Master of Arts upon Grace Putnam Wenham.

On May 20th, the degree of Doctor of Medicine upon Frank Acker, George John Ashby, Louis P. H. Bahrenburg, Homer Calvin Ballard, Frank Peter Charvat, George Ray French, Jacob Fridline, George F. Garmier, Harry Lorenzo Gilchrist, Nehemiah Atwood Harring, B. S., Charles Jenner Harris, William Hendry, George Thomas Holmden, Anson P. Howland, William Grant Huffman, James Francis Kelley, Charles Edward Kimerline, Walter Bell Laffer, Thomas Linley, William Pence Love, A. B., Henry R. Morse, Louis Theodore Schurrer, Henry Richard Simon, Torald Sollmann, Charles H. Tanner, A. B., Samuel J. Webster, Edward W. Wellman.

On June 17th, the degree of Bachelor of Laws upon Emmett Lee Coleman, Charles John Gould, Frederick William Green, Max Joseph Rudolph, Charles Herbert Taylor, Josef Herman Wenneman, Jerry R. Zmunt.

On May 19th, the degree of Doctor of Dental Surgery upon William George Ebersole, Frank Henry Fagan, Joseph Wilbert George, William Oscar Haldy, Charles Emery Hurd, John Lewis Thomas, John Sherman Van Meter.

THE LIBRARY REPORT.

Immediately after Commencement, the books belonging to the Library were moved into the new Hatch Library building, and the building opened for use on the first day of the fall term. This marks a very notable step forward in the development of Western Reserve University. The building is an inspiration to all who enter its doors.

The notable gifts to the Library since the publication of the last Bulletin are as follows: $1000.00 from Hon. John Hay, with the promise of similar amounts in 1897 and 1898; $800.00 from Mrs. Samuel Mather; $10.00 annual donation from Mr. J. G. White.

The additions to the Library since March 1 have been 1399 bound volumes and about 150 pamphlets and unbound books. This does not include many of the minor government publications, catalogues, reports of college and university officers, and much similar matter. The most numerous and important additions have been made to the departments of French, Latin and Greek.

To the first named department nearly five hundred volumes have been added, from which number may be mentioned the complete works of the following authors: Le Maire de Belges, 4 vols.; Quinault, 5 vols.; Florian, 8 vols.; Millevoye; Villon; Andrieux, 5 vols.; Helvetius, 6 vols.; Arnault, 4 vols.; Crébillon, *fils*; Louis Racine; Melin de St. Gelays, 3 vols.; Chapelle and Bachaumont; Rutebeuf, 3 vols.; Tabarin, 2 vols.; Coquillart, 2 vols.; Louis de Sacy; Volney; Pierre Nicole; St. François de Sales, 4 vols.; Regnard, 6 vols.; Mme. Staal-Delaunay, 2 vols.; Casimir Delavigne, 6 vols.; Beaumarchais, 6 vols.; Baudouin and Jean de Condë, 3 vols.; Chastellain, 8 vols.; Chateaubriand, 12 vols.; Mme. Riccoboni, 8 vols.; Houdar de la Motte, 11 vols.; and many others. Among the notable sets are the following: Societé des Anciens Textes Français, 65 vols. (complete). Chansonnier Historique du 18me Siècle, 10 vols. Zeitschrift für Romanische Philologie, 25 vols. (complete). Petitot's Repertoire du Théatre Français, 17 vols. Goujet's Bibliothèque Française, 18 vols.

The French department has now a good working library of more than 2,000 volumes.

The Latin department has added to its collection many of the recent works in criticism, and important editions of Cicero, Plautus and Horace. The following works on numismatics are worthy of note:

Eckhel—Doctrina Numorum, 8 vols. and supplement.

Cohen—Medailles Imperiales, 8 vols.

Cohen—Medailles Consulaires.

Mommsen—Geschichte des Römischen Münzwesens.

The most important additions to the Greek department have been recent works on art. Paul Hartwig's "Die Griechischen Meisterschalen der Blüthezeit" is worthy of mention.

THE SPRING MEETINGS OF THE TRUSTEES.

At the meeting of the Trustees of the University on March 17, the contract between the University and Lakeside Hospital (see *University Bulletin*, vol. II, No. 1, p. 38) was approved.

A committee consisting of Messrs. Garfield, Holden and Thwing was appointed to devise ways and means for erecting a Biological Laboratory, which is so sorely needed.

At the meeting on May 19th the following gifts were announced: $5,000 from Mr. A. A. Pope, of Cleveland, a subscription to the building fund of the Biological Laboratory; $13,000 from Col. Oliver Payne, of New York, for the purchase of land adjoining the Medical College.

Messrs. Williamson, Cushing, Mather, Wade and Tyler were constituted the Executive Committee of the Trustees of the University.

The University Senate was appointed for the year 1896-7, consisting of the Executive Committee, the Deans of the several departments, and Professors Curtis and Warren of Adelbert, Bourne and Fowler of the College for Women, Lowman and Allen of the Medical School, Johnson and White of the Law School.

The following appointments were made:

Dr. C. F. Hoover to be Professor of Physical Diagnosis.

Dr. E. F. Cushing to be Professor of the Diseases of Children.

Dr. W. H. Humiston to be Assistant Professor of Gynæcology, with seat and vote in the Faculty.

Dr. W. H. Nevison to be Lecturer on Minor Surgery and Bandaging.

Dr. W. H. Hulme to be Associate Professor of English in the College for Women for two years.

Miss Alma Blount, Ph. D., to be Instructor in English in the College for Women for one year.

The resignations of Dr. John C. Spenzer, Instructor in Pharmacology and Experimental Therapeutics, and of Miss Jennette Barbour Perry, Professor of English, were accepted.

A committee on the conferring of Honorary Degrees was appointed, consisting of Messrs. Perkins, Haydn and Parsons.

Bursars of the different departments were appointed as follows: Medical School, Professor Ashmun; Dental School, Professor Whitslar; Law School, Professor Hopkins; College for Women, Professor Bourne.

It was voted that of the income of the Harkness Foundation for the following year, $500 should be applied to the purchase of books in the department of Biblical Literature, and $500 for lectures.

At the meeting of the Trustees of Adelbert College, on May 19th, the following appointments were made:

Professor Oliver Farrar Emerson, of Cornell University, to be Oviatt Professor of Rhetoric and English Philology.

Associate Professor S. F. Weston to be Associate Professor of Political and Social Science for two years (reappointment).

Mr. Vernon J. Emery to be Instructor in Latin for one year (reappointment).

Dr. Hippolye W. Gruener to be Instructor in Chemistry for one year (reappointment).

Mr. A. B. Christy to be Instructor in Elocution for one year (reappointment).

Dr. Edward Stockton Meyer, Jr., to be Instructor in German for one year.

Leave of absence until December 1st, 1896, was granted to Professor F. H. Herrick.

At the meeting of June 16th Professor A. L. Fuller was appointed Bursar of Adelbert College.

The following Trustee Committees were appointed:

Executive Committee, Messrs. Mather, Perkins, Williamson, Williams, Hatch.

Committee on Instruction, Messrs. Williamson, Haydn, Perkins.

Committee on Western Reserve Academy, Messrs. Hitchcock, Crocker, Bushnell.

Committee on Buildings and Grounds, Messrs. Williams, Holden, Bushnell.

Committee on the Budget, Messrs. Handy, Mather, Bushnell, Tyler, Pope.

The following resolution was adopted:

"We beg to renew our thanks to our associate, Mr. H. R. Hatch, for erecting and furnishing the Library building, and we beg to request that a portrait or bust of himself be placed in the beautiful building which bears his name."

NOTES.

Oliver Farrar Emerson, Ph. D., who has just assumed the duties of the Oviatt Professorship of Rhetoric and English Philology, received the degree of A. B. from Iowa College in 1882, and A. M. in 1885. He was Superintendent of Schools at Grinnell, Iowa, for two years from 1882; at Muscatine, in the same state, during the year 1884-5, and the next year Principal of the Academy of Iowa College. In 1888-9 he was Goldwin Smith Fellow in English at Cornell University, and Instructor in English 1889-91. In 1891 he received the degree of Ph. D. from Cornell, and was Assistant Professor of Rhetoric and English Philology from 1892 to 1896. Professor Emerson is the author of a History of the English Language (1894), and a Brief History of the English Language (1896). He has edited Johnson's Rasselas, and contributed various articles to the Dial, Nation, Modern Language Notes, The School Review, Education, etc.

Edward Stockton Meyer, Jr., Ph. D., recently appointed Instructor in German in Adelbert College and in the College for Women, was graduated at Adelbert College in 1893, with the degree of B. L. The year 1893-94 he spent at Leipzig, studying with Sievers, Von Bahder, Wülker and Brugmann, and the next two years at Heidelberg with Braune, Schick, Neumann, Kuno Fischer, Winkelmann and Osthoff. He received the degree of Ph. D., in 1896, his dissertation being entitled, "Machiavelli und das Elizabethanische Drama," which will soon be published.

Miss Alma Blount, who has begun work as Instructor in English in the College for Women, graduated as B. S. at Wheaton College in 1886, and as A. B. from the same institution in 1890. From 1886 to 1893 she was an Instructor in English at Wheaton. The years 1893-96 Miss Blount spent at Cornell in the study of English, being a Scholar in English Philology in 1894-5, and Fellow in 1895-6. She received the degree of Ph. D. from Cornell last June.

Dr. Robert MacDougall, who will take Professor Curtis' place during this year, graduated at McGill University in 1890, and studied Philosophy in the Graduate Department of Harvard from 1892 to 1895. During 1894-5 he was Morgan Fellow. In 1893 he received the degree of A. M., and in 1895 that of Ph. D. from Harvard. During the year 1895-96, Dr. MacDougall held the Walker Fellowship, and spent his time in work at the University of Berlin and the Sorborne. In 1896 he was appointed Assistant in Philosophy at Harvard.

Professor Charles Davidson, for two years Associate Professor of English in Adelbert College, was in June last appointed an Examiner of English in the public schools of New York State.

Dr. Mattoon M. Curtis, Handy Professor of Philosophy in Adelbert College, has been granted a year's leave of absence by the Trustees, which he will probably spend in Europe. His work will be carried on by Dr. MacDougall.

Dr. W. H. Hulme, for the past two years Instructor in German, has been appointed Associate Professor of English in the College for Women.

Miss Jennette Barbour Perry, Professor of English in the College for Women, resigned her position last June.

Mr. Herbert Tetlow has been appointed Assistant in Biology; Mr. E. D. Holmes, Assistant in English; Mr. C. G. Lang, Director of the Gymnasium, and Mr. Chase, Assistant in Economics.

Ex-Governor Hoadley of Ohio, a graduate of Western Reserve College in the class of 1844, has presented to the College a beautiful bronze tablet in memory of Dr. George Edmond Pierce, President of the College from 1834 to 1855. This tablet will be erected in the new Library.

The General Catalogue of Officers and Students of Adelbert College (originally Western Reserve College) from its beginning in 1826 down to and including 1895, was published last June. It was compiled by Mr. E. O. Stevens, of the class of 1888, and an assistant in the English Department. The following statistics are cited (1826-1895):

Number of Presidents	6
Number of Treasurers	10
Number of Professors	45
Number of Tutors and Instructors	53
Whole number of Students	1334
Number of Graduates	680
Number of Living Graduates	488
Number of Non-Graduate Students	654
Number of Living Non-Graduate Students	524

A new executive office in each Department, that of Bursar, has been created by the Trustees, to lighten the labors of the Treasurer and to facilitate the collection of fees from students. Prof. Fuller fills this office for Adelbert College, Prof. Bourne for the College for Women, Prof. Hopkins for the Law School, Prof. Ashmun for the Medical School, and Prof. Whitslar for the Dental School.

The following statistics of students in some of the departments of the University are of interest:

ADELBERT COLLEGE.

Additions to Upper Classes	4
Regular Freshmen	59
First Year Specials	9
Total No. of new students	72
Total No. in the College	159

COLLEGE FOR WOMEN.

Additions to Upper Classes	3
Regular Freshmen	36
First Year Specials	8
Total No. of new students	47
Total No. in the College	126

The total number in the Law School is 68. No definite statistics can be given regarding the registration in the Medical and Dental Departments.

Professor Henry E. Bourne has been made a member of the Société de la Révolution Français. He is the only member from the United States.

Prof. F. H. Herrick has been granted leave of absence until Dec. 1st, and is investigating the biological laboratories in Europe. It is hoped that a biological laboratory may be begun here next spring.

Prof. Cushing continued his work in the Adirondacks under the direction of the State Geologist during the past field season. The main object of the work was the areal mapping of the Potsdam-Pre-Cambrian, and Potsdam-Calciferous boundaries on the north side of the Adirondacks. It is completed to a point a few miles west of Potsdam.

Professor Emerson is to edit the Middle English poem "Pearl" for the Albion series, published by Ginn & Co. The series is under the general editorial direction of Professors Bright and Kittredge.

Prof. Robb, with Prof. Jewett, of Brooklyn, is at work upon a Practical Treatise on Obstetrics, intended especially for the use of students.

The Dental Department has moved into the Bangor Building, 262 Prospect street, next to the Y. M. C. A. Building, where the entire fifth and sixth floors have been specially designed and equipped for dental purposes. Several new features in appliances and teaching have been added, among these two laboratories, one for Juniors, the other for Freshmen; a standing movable amphiteatre which enables a large number to obtain a close and distinct view of dental and oral operations; and a large collection on comparative anatomy, purchased from Ward, of Rochester, N. Y.

Prof. Ambler has in press a monograph on "Tin Foil and its Combinations for Filling Teeth."

NEW BUILDINGS.

The Hatch Library is a building cruciform in plan, and when completed is to be 95x101 feet with a tower 15x15 feet, forming a main entrance. Only the main building, 33x101 feet, and tower are now complete, it being the intention to build the arms or wings 28x32 feet each, in the near future. The building is two stories high with a basement. The basement, 8 feet in the clear, contains a large workshop with suitable shelving, tables, etc., a men's toilet and coat room and a lift extending from basement to the second story reference room. The first story, 13 feet in the clear, with double entrances through the tower, contains an entrance hall, a reading room 15x30 feet, furnished with corner seats, desk and two periodical cases, also a women's toilet and cloak room, the Library Hall, 26x30 feet, and a stack room 30x40 feet. The stack-room is fitted with wrought steel stacks, and is capable of holding 42000 volumes. The stack-room is fire-proof, being constructed with brick walls, steel beams with terra cotta coverings. The Library hall, with opening to roof, forming a rotunda in effect, is fitted, with the librarian's alcove, with desk, suitable closets, shelving and card cases. A spacious stairway leads to the second story, which is one large room 30x80 feet, forming a reference and work room, with open timber roof, the framing of which is 20 feet in height. At the south end, three book cases on each side form alcoves, and at the north end, steel racks on each side and end give provision for books. Suitable tables, chairs and cabinets provide the students with conveniences for work.

The building is English Gothic in design, known as the college type, consistent in design throughout, solidly built of buff Ohio sand stone, laid in broken ashlar. The stone walls are backed with brick. The interior finish is of Georgia pine, natural finish, including the floors. The tower entrance has a marble mosaic floor. The roof of main building is of black Maine slate, and the projections of copper.

The glass is cathedral, of amber tints in lead and copper designs, and, except in the reading room and librarian's room, it is polished plate glass. The windows of lobby and stair hall are in deep blue opalescent glass with gold and pearl emblematic forms, open book and cross keys. The glass in the large rose window of the main gable is filled with pearl and gold opalescent glass in leaded line.

The building is heated and ventilated with steam taken from another building. The lighting is with gas, the fixtures old brass, in Gothic forms. The architect is Mr. C. F. Schweinfurth.

The building for the Franklin T. Backus Law School of Western Reserve University is nearly completed. It is 76 feet front by 44 feet wide, with basement and two stories, and so arranged that a wing 40 by 50 feet, two stories high, may be added in the future.

The building is constructed of Ohio buff sandstone, laid in courses, backed with brick, and has a copper roof. The entrance is through a portico into the main hall 19 feet wide. The stairs, down, lead to men's and women's toilet and coat rooms, and bicycle hall. There is also a boiler room and a janitor's shop in the basement. On either side of the main hall, first story, are recitation rooms, 25 feet by 40 feet, 13 feet in the clear, and on the second story a recitation room, 25 feet by 40 feet, and a stack room 25 feet by 40 feet, 15 feet in the clear; also two professor's rooms, 9 feet by 12 feet, 12 feet in the clear. Each room is abundantly lighted with spacious windows and finished in dark quartered white oak. A broad flight of stone steps, flanked with buttresses on which are to stand candelabra, form the approach to the portico. The floor of the portico is to be of Italian white marble, the walls being Pompeian brick, the ceiling to be paneled in oak. On the frieze of portico in Roman letters are the words Lex– Lex– Lex– and over this portico is the seal of the University cut in relief.

A broad cut stone frieze extends around under the main cornice on which is cut in Roman letters this inscription: "And thou shalt teach them ordinances and laws, and shalt show them the way wherein they must walk, and the work that they must do."

The effect is Italian Renaissance. The building is heated with steam and lighted with gas, the fixtures corresponding in design with the building. The architect is Mr. C. F. Schweinfurth.

LIST OF PUBLICATIONS.

The following is a list of publications between March 1, 1896, and October 1, 1896, by members of the faculties of Adelbert College and the University, so far as returns have been secured. The names are arranged alphabetically:

HENRY L. AMBLER, M. S., D. D. S., M. D.—*Professor of Operative Dentistry and Dental Hygiene.*

"Cataphoresis for Obtunding Sensitive Dentine." Four articles in *Ohio Dental Journal*, April, May, June, July, 1896. The April article also in *The Western Reserve Dental Journal*. The May article in *Die Zahntechnische Reform*, Berlin.

'Systemic Remedies," *Ohio Dental Journal*, August, 1896.

"Enamel Nodules on Roots of Teeth," read before the American Dental Association, Saratoga, August, 1896, published in their *Transactions*, also in *Ohio Dental Journal*, October, 1896.

LOUIS P. BETHEL, M. D., D. D. S.—*Assistant in Bacteriology.*

"A Feasible Method of Instructing the Public in Dental Matters." Paper read before the Mississippi Valley Dental Association, Cincinnati, in April, 1896. Published in the *Ohio Dental Journal*, May, 1896, and the *Dental Register*, May, 1896.

"Lining Root-canals." Paper read before the American Dental Association, Saratoga, N. Y., August, 1896. Published in the *Dental Cosmos*, September, 1896, *Dental Register*, September, 1896, and *Ohio Dental Journal*, September, 1896.

"Germicides and Antiseptics." Prize essay which won the $60 prize in Palisade Manufacturing Co.'s contest open to dentists throughout the world, September, 1896.

HENRY E. BOURNE, B. D.—*Professor of History.*

"The Organization of the First Committee of Public Safety." Annual report of the American Historical Association for 1894, pages 247–272.

Souveraineté du peuple et Gouvernement, per Eugène d'Eichthal. Review.—*Annals of the American Academy*, Vol. VII, pp. 136–138.

"The Eastern Question." *The Dial*, May 1, 1896.

"The Story of Cleveland." *The New England Magazine*, Vol. XIV, 739–763.

Bibliographical Report, presented to the North-Eastern Ohio Teachers' Association, pp. 18–23 of *Outline of Civics and History*, published by the Association.

"A French Educational Experiment in the Sixteenth Century." A note, *The Nation*, August 20.

"The Committee of Public Safety." A note, *The Nation*, September 3.

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Henry S. Upson, M. D.—*Professor of Neurology.*

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Henry Clay White, A. M., LL. B.—*Professor of Testamentary Law.*

"Relation of Legal Education to Citizenship." Address at laying of corner stone of Law Building, June 16th, 1896. Published in *Ohio Legal News.*

PUBLIC LECTURES AND PAPERS.

The following is a record of public lectures and of papers before learned societies, etc., delivered between March 1, 1896, and October 1, 1896, and not published before October 1, 1896.

(When the author's title or position have already been mentioned in the List of Publications they are not repeated in this list.)

H. Austin Aikins, Ph. D.—*Professor of Philosophy.*

Twenty Lectures on Pedagogy, April–June, 1896.

Henry L. Ambler.

"Cataphoresis." Read before The Lake Erie Dental Association, May, 1896, Cambridgeboro, Pa.

Louis P. Bethel.

"How to Obtain the Best Results from the Use of Disinfectants." Read before the Northern Ohio Dental Society, Cleveland, June, 1896.

Henry E. Bourne.

"Inter-Relations of Geography and History." An address delivered at a meeting of the

Superintendents and Principals of Western Pennsylvania and Eastern Ohio, April 24, 1896.

"The Eastern Question." A lecture delivered at Clark Hall, April, 1896.

"The Territorial Development of the United States." A lecture delivered before the Men's Club of the Euclid Avenue Disciple Church, April, 1896.

"The Expansion of Cleveland." A lecture delivered in Adelbert College, June 10, 1896.

"The Government of Paris," and other lectures delivered before the Temple Society, March–April, 1896.

WILLIAM T. CORLETT.

"A Further Consideration of Dermatitis Hiemalis." Read before the third Congress of Dermatology, London, August, 1896.

MATTOON MONROE CURTIS.

"The Intellectual Development of Cleveland." Address at the dedication of the Hatch Library Building, June 14th, 1896. (Printed in this number of the *Bulletin.*)

ALEXANDER HADDEN, A. M.—*Professor of the Law of Crimes.*

"The Bertillon System of Identifying Criminals." Read before the Medico-Legal Society of Cleveland, April 16, 1896.

HIRAM C. HAYDN, D. D., LL. D.—*Vice-President of the University and Instructor in Biblical Literature.*

"The Triumph of Reason and Conscience over Brute Force in International Relations." Address at the Commencement of the Law School, June 15, 1896.

"One Hundred Years in the Religious Life of Cleveland and Seventy Years in the Life of the First College." Address delivered in Beckwith Church before the Western Reserve Alumni Association, June 16, 1896.

EDWIN V. MORGAN, A. M.—*Instructor in History.*

"The Transvaal." Lecture delivered at Wells College, Aurora, N. Y., March 28th, 1896, and at Geneva, N. Y., on the same date.

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EMMA MAUD PERKINS, A. B.—*Professor of Latin.*

"Women in Reform Work." Address at Trinity Congregational Church, March 11, 1896.

Address at Commencement of Miss Buckingham's School, in Lutheran Church, Canton, Ohio, June 5, 1896.

HUNTER ROBB.

"The Relaxation of the Vaginal Outlet as the Main Etiological Factor in Various Pathological Conditions." Read before the Clark County Medical Society, of Springfield, Ohio, July 9th, 1896.

"On the Systematic Microscopic Examination of Uterine Scrapings and of Excised Pieces of the Uterus as an Aid to Diagnosis." Paper for the American Gynæcological Society, May, 1896. (To appear in the *American Journal of Medical Sciences* and the *Monatsschrift für Gynäkologie*, Berlin, Germany, within the next two months.)

HENRY S. UPSON.

"Intestinal Antisepsis in the Treatment of Nervous Diseases." Read before the American Neurological Association, June 4, 1896.

"Causes of Nervousness." Lecture delivered before the Canton Medical Club, June 6th, 1896.

"Reflex and Toxic Neuroses." Lecture delivered before the County Medical Society, at Erie, Pa., June 7th, 1896.

STEPHEN F. WESTON, A. M.—*Associate Professor of Political and Social Science.*

"The Philosophy of the State." Lecture delivered before the Summer School of Philosophy, at Hurricane, N. Y., August, 1896.

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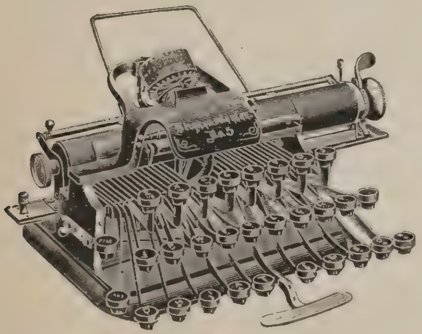

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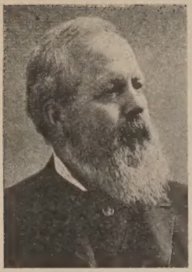

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